RATE ANALYSIS AND TESTING OF MATERIALS FOR BUILDING

C.H. GOPINATHA RAO

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ABOUT THE AUTHOR

C. H. Gopinatha Rao, a Post – graduate in Structural Engineering, Registered Architect, Chartered Engineer, Registered Valuer and an Arbitrator in several disputes including disputes of parties with Statutory Bodies, appointed as a Sole Arbitrator in some cases by the Madras High Court. Designed / executed more than 300 buildings which include residential, commercial, schools and steel stockyard.

Valued a very large number of properties of different types which include factories, hotels, hospitals, commercial and residential buildings. Delivered lectures as a Guest in various Forums including IIT Madras and contributed articles in different magazines including "The Hindu".

Authored 48 books on real estate and housing. His two books have received the Tamil Nadu State Government Awards in 1986 and in 1998.

Served as Chairman of Tamil Nadu State Centre of the Institution of Engineers with the purpose of serving the community by educating the common man on all aspects of Housing, he made the activities of the Institution more broad- based.

Served as President, Association of Licensed Engineers and Architects; Chairman, Association of Consulting Civil Engineers and Chairman. Indian Concrete Institute. As Founder – Chairman of the Institution of Valuers, Tamil Nadu Zone, served for about 12 years and as National President for one year.

Many public issues relating to Building Trade were brought to the attention of the Government for redressal by him and he succeeded partly. Served as President, Lions Club of Padi, Founder Secretary, "Citizens Association for Rights and Duties" known as CARD. Served as Assistant Secretary, Indian Institute of Public Administration, Tamil Nadu. His service is utilized by Consumer Forums to get clarification in all aspects of buildings.

The Rotary Club of Madras (West) bestowed on him "For the Sake of Honour" Award for the year 1983 – 1984. Recipient of "Engineer for Excellence" Award for the year 2000 bestowed by Institution of Engineers (India), Tamil Nadu State Centre.

Served as Special Consultant for CMDA TRF Research Programmed for Chennai 2011 and presented a paper on Value of Land in Chennai Metropolitan area. His services were utilised by DANIDA, Government of Tamil Nadu for developing plans and guidelines for constructing Health Centres with community support.

Served as a member of Selection Committee for recruitment of about 50 Engineers for LIC of India in the ranks of Asst. Engineers up to Deputy Chief Engineers in 1993.

Served as a member of Project Evaluation Committee in HUDCO and as a member of Working Group on Urban Development in formulating the Tenth Five – Year Plan.

'Builders Line', a popular Tamil monthly magazine bestowed on him with Lifetime Achievement Award for his immense contribution as an Engineer in the construction field in September 2006.

Invited to serve as a Member of Planning and Development Committee, University of Madras in 2007. The 39th Annual Session of the Institution of Valuers held at Kolkatta during December 2007 felicitated him as one of the Renowned Valuer of the country.

The Maharashtra Association, Chennai was pleased to present "The Great Maratha Award" for his lifetime achievement on 1.5.2010

The Institution of Valuers,India awarded him gold medal for his article on "What is GuideLine Value (also known as Circle Rate in some states) and whether the same can be taken as Market Value" published in May,June and July 2013 issues of the Indian Valuer on December 2013.

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INTRODUCTION

Item Rate Contract is the popular and effective type of building contract in the execution of buildings. In this method, bills of quantities are prepared by the Architect after finalising the drawings and tenderers are invited to quote the rates, item wise. The Contractor is paid for actual quantity of work done as measured at site as per the rates quoted by him in the tender schedule. The advantage in this method is the flexibility to make changes of minor nature in respect of the quantity of items, deletion of some items if necessary or awarding some items of work to other agencies and it will be advantageous for both the parties during settlement of bills. However, these advantages can be had only when the tender documents are prepared properly and the terms and conditions clearly specified.

A Tender-Document comprises of :

(i) Notice inviting Tenders

(ii) Bills of Quantities

(iii) Drawings relating to to in Bills of Quantities

(iv) Complete specifications of work to be done including the make/brand of the fittings and/or materials to be used.

(v) Essential architectural drawings and necessary structural drawings with specifications that are essential to quote for the works without any ambiguity.

It should be ensured that the list of materials of any brand/type proposed and envisaged in the bills of quantities are available in the market.

In the case of private works, the employer and/or architect has the liberty to issue tender documents to a selective tenderers of his/their choice. In case of buildings executed with public money, it is essential to publish the noice in the press and invite tenders from the eligible tenderers, before evaluating and selecting the contractors. In such cases, it is possible that a few tenderers with for whom it will be difficult to execute work may also tender for the works, may be they are litigants or incompetent or not financially sound. In order to restrict the tenderers, sometimes, pre-qualification notice is given and only a few tenders are selected based on the past performance and their reputation and this process of selecting the contractor enables in issuing the tender docuemnt only to eligible contractor and deciding the persons as early as possible without much loss of time.

The terms and conditions should specify the mode of payment, advance secured against materials that are to be incorporated in the works; the items against which advance can be granted after obtaining insurance cover and items agaisnt which no secured advanced will be granted should be clearly mentioned.

The conditions should also specify the party that has to bear the expenses towards taxes and levies payable under the respective statutes. Also the position regarding the supply of power and water for the works should be specified.

The method of arriving at the rates for the supplementary items should also be indicated. The method of measurement of works, testing of materials and workmanship should also be specified.

This book has dealt in detail the method of testing of materials for building works, rate analysis for items of works normally required for house construction.

II TERMINOLOGY (as furnished by N.B.O.)

Absorption: The process by which a liquid is drawn into and tends to fill permeable pores in a porous body, also the increase in weight of porous solid body resulting from the penetration of a liquid into its permeable pores.

Admixture: A material other than water, aggregates and hydraulic cement, used as an ingredient of concrete or mortar, and added to the batch immediately before or during its mixing to modify one or more of the properties of the concrete.

Aggregate: Granular material, generally inert, such as natural sand, manufactured sand, gravel, crushed gravel, crushed stone, and air-cooled iron blast furnace slag which when bound together into a conglomerated mass by a matric forms concrete or mortar.

Anti-siphonage: The device to preserve the water seal in traps by providing ventilation.

Asphalt: A natural or artificial mixture in which bitumen is associated with inert mineral matter. The word 'Asphalt' should always be qualified by indication of its origin or nature.

Ballast: Stone or gravel mixture of irregular unscreened sizes which may also contain smaller material.

Batten: A piece of sawn timber whose cross-sectional dimensions do not exceed 5 cm. in either direction.

Bar: A metal member used to reinforce concrete.

Bar, Deformed: A reinforcing bar with manufactured surface deformations which provide a locking anchorage with surrounding concrete.

Balcony: A horizontal projection, including a hand rail, or balustrade, to serve as passage or sitting out place.

Basement or Cellar: The lower storey of a building below or partly below ground level.

Base Course: That part of the construction resting upon the sub- grade and through which the load is transmitted to the sub-grade or the supporting soil. A base course is the layer immediately under the wearing surface.

Baulk: A piece of sawn timber whose cross-sectional dimensions not less than 5 cm. at top and not exceeding 20 cm at the but tend.

Barge Board: In case of gable roof where there is no gable parapet and the roof projects beyond the gable, the barge boards are planks running down from the edges to the eaves covering the outermost rafter.

Batter: A small inclination from the vertical.

Beam Filling: The filling of the gap between the ceiling level and the wall bearing level excluding portions occupied by beams, rafters, etc.

Bed Block: A block bedded on a wall column or pier to distribute the pressure from concentrated load.

Bedding: A layer of concrete or other suitable material on the trench floor to provide continuous support for the pipes.

Benching: The sloped floor of a manhole or an inspection chamber on both sides and above the top of the channel.

Beam: A structural member usually made of steel R.C.C. timber etc. used generally in the horizontal position to carry load.

Bitumen: A non-crystalline solid or viscous material, having adhesive properties, derived from pertroleum either by natural or refinery processes, and substantially soluble in carbon disulphide.

Bitumen Cutback: Bitumen which has been blended by a volatile diluent.

Bitumen Emulsion: A liquid product in which a substantial amount of bitumen is suspended in a finely divided condition in an aqueous medium.

Bloated: Swollen, as certain light weight aggregates as a result of processing.

Bond: Arrangement of the bricks in successive courses to the brickwork together both longitudinally and transversely; the arrangement is usually designed to ensure that no vertical joint of one course s exactly over he one in the next course above or below it, and there is the greatest possible amount of lap.

Bulking: Increase in the bulk volume of a quantity of sand in a moist condition over the volume of the same quantity dry or completely inundated.

Butt Joint: Joint in which two pieces of timber are joined end to end usually across the grain. Sometimes dowels are used in such a manner that half of the dowel is thrust in each piece.

Building Lime: A lime whose chemical and physical characteristics and methods of processing make it suitable for construction purposes, also known as 'Construction lime'.

Bulk Density: The weight of a material (including sold particles and any contained water) per unit volume including voids.

Butteress: A vertical supporting member built on the exterior of a wall and property bonded to it to enable it to resist the outward thrust.

Bulking: The increase in volume of a material due to manipulation. Rock bulks upon being excavated damp sand bulks if loosely deposited, as by dumping, because the apparent cohesion and surface repulsive forces prevent movement of the soil particles to form a reduced volume.

Camber: The convexity given to the curved cross-section of a carriage way, between the crown and the edge of the carriage way; it is the difference in level between the crown and the edge of the carriage way.

Centering: A temporary supporting structure to a soffit.

Cement paste: A mixture of cement and water; may be either hardened or un-hardened.

Chips: Broken fragments of marble or other mineral aggregate screened to specified sizes.

Chajja: A sloping or horizontal structural overhang usually provided over openings on external walls to provide protection from sun and rain.

Check: A fine crack in timber members.

Cleat: 1. A piece of timber fixed on principal rafter to secure the purlins.
2. A piece of wood used as a device to keep the door or window shutter in the open position.

Cinder: Well burnt furnace residue which has been fused or sintered into lumps of varying sizes. The same material in a finely powdered form is found to possess some pozzolanic activity.

Clay: An aggregate of microscopic and sub-microscopic particles derived from the chemical decomposition and disintegration of rock constituents. It is plastic within a moderate to wide range of water content.

Closer: Part of a brick or other masonry unit such as stone concrete either manufactured or cut from a whole brick or other masonry unit used to maintain bond.

Contractor: The contractor shall mean the individual or firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative or such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assigns of such individual or firm or firms or company.

Coarse aggregate: Aggregate most of which is retained on 4.76 mm IS sieve and containing only so much of finer material as is permitted by the specification.

Coping or weathering: The cover applied over or the geometrical form given to a part of structure to enable it to shed rain water.

Corbel: A cantilever projecting from the face of a wall to form a bearing.

Cornice: Horizontal ornamental feature projecting from the face of a wall.

Course: A layer of bricks including bed mortar.

Cobble: A rock fragment between 64 and 256 mm in diameter as applied to coarse aggregate for concrete, the material in the nominal size range 75 to 150 mm.

Cold Twisted Deformed Bar: A bar of steel produced by cold twisting a hot rolled bar and which has lugs, ribs or deformations on its surface in accordance with definitions for deformed bars.

Consistency: The relative mobility or ability of freshly mixed concrete or mortar to flow, the usual measurements are slump for concrete and flow for mortar, cement paste or grout.

Concrete Dense: Concrete containing a minimum of voids.

Controlled Concrete: The concrete, in which the proportion of aggregates to cement and water are determined by preliminary tests of the materials to be used and the water-cement ratio for concrete of a specified strength is determined by prescribed method, shall be classified as controlled concrete. The minimum quantity of cement to be used in controlled concrete for reinforced concrete work shall be not less than 220 kg. per cu. metre of concrete.

Construction Joint: The interface between adjacent concrete pours which are designed to act monolithically in the completed structure.

Compaction: The densification of a soil by means of mechanical manipulation.

Consolidation: The gradual reduction in volume of a soil mass resulting from an increase in and continued application of compressive stress and is due to the expulsion of water from the pores.

Creep: Time dependent deformation due to load.

Crown: The highest point (in cross section) of a curved road surface, commonly at or near the centre. The level of crown is called road surface level.

Cube strength: The load per unit area at which a standard cube fails when tested in a specified manner.

Curing: Maintenance of moisture conditions to promote continued hydration of cement.

Damp-proof Course: A layer of impervious material laid or inserted in a structure to arrest the permeation of dampness.

Deformation: Change in shape.

Diameter of a knot: The maximum distance between two points farthest apart on the periphery of a round knot, on the face of which it becomes visible. In the case of a spike or splay knot, the maximum width of the knot visible on the face on which it appears shall be taken as its diameter.

Down-Pipe: Pipe which collects rain water from the roof, from the roof-gutters, or from both, and conveys it to a drain, sump or other point of discharge.

Drain: A line of pipes including all fittings and equipment, such as manholes, inspection chambers, traps, gullies and floor traps used for the drainage of a building, or a number of buildings, or yards appurtenant to the buildings, within the same curtilage. Drain shall also include open channels used for conveying surface water.

Drop Connection: A branch drain of which the last length of piping of the incoming drain before connection to the sewer is vertical.

Drop Manhole: A manhole incorporating a vertical drop for the purpose of connecting a sewer or drain at high level to one at a lower level.

Dubbing out: It shall mean filling in hollows in the surface of wall and roughly levelling up irregular or out of plumb surfaces prior to rendering.

Eaves: The lower edge of the inclined roof.

Efflorescence: A powdery encrustment of salts left by evaporation. This may be visible on the surface or may be below surface. The later case this is termed as crypto-florescence.

Embankment: An earthwork raised above the natural ground by the deposition of material to support construction at a higher level.

Eminently Hydraulic Lime: Lime containing some qualities of Silica and Alumina (and/or iron oxide) which are in chemical combination with some of the Calcium Oxide content. This gives a putty or mortar, which has the property of setting and hardening under water.

Even and Fair: The terms "even and fair" as referred to finishing of the final plastered surface, shall mean a surface finished with a wooden float.

Expanded Metal: A metal network, often used as reinforcement in concrete construction, formed by suitably stamping or cutting sheet metal and stretching it to form open meshes, usually of diamond shape.

Eye: A circular hole in the roof.

Fair Face: A plain concrete finish better than that produced from rough formwork.

Fat Lime: Connotes a pure non-hydraulic lime. It may be in quick hydrated or putty form.

Fine Aggregate: Aggregates most of which passes 4.75 mm IS sieve and containing only so much coarse material as is permitted for various grading zones in the specification.

Fineness modulus: An empirical factor obtained by adding the total percentages of a sample of the aggregate retained on each of a specified series of Sieves, and dividing the sum by 100.

Filler : a) Finely divided inert material, such as pulverized lime stone, silica, or colloidal substances sometimes added to Portland cement paint or other materials to reduce shrinkage, improve workability or act as extender.
b) Material used to fill an opening in a form.

Flyash: A finely divided residue that results from the combustion of ground or pulversied coal and is transported from boilers by flue gases and collected by cyclone separation or electrostatic precipitation.

Floating Coat: It shall mean the second coat used in a three-coat work, to bring the rendering coat to a true and even surface before the setting coat is applied.

Flat Roof: A roof the pitch of which is 10^{o} or less to the horizontal.

Form (Shutter) : a) That part of a form work which consists of the sheeting and its immediate supporting or stiffening members.
b) A temporary structure or mould for the support of concrete while it is setting and gaining sufficient strength to be self- supporting.

Formwork: (Shuttering): Complete system of temporary structure built to contain fresh concrete so as to form it to the required shape and dimensions and to support it until it hardens sufficiently to become self-supporting. Form work includes the surface in contact with the concrete and all necessary supporting structure.

Formation: The surface of the ground in its final shape and level after completion of earth-work.

Foundation: That part of the structure which is in direct contact with and transmitting loads to the ground.

Free Moisture: Moisture not retained or absorbed by aggregate.

Gable: The triangular upper part of a wall at the end of the ridge.

Gablet: A small gable.

Gravel: Cohesionless aggregates of rounded, sub-rounded, angular, sub-angular, or flat fragments of more or less unaltered rocks or minerals, 90 percent of the particles of size greater than 2 mm and less than 60 mm.

Granolithic Concrete: Concrete made with specially selected aggregate of high hardners, surface texture and particle shape suitable for use as a wearing finish to floors.

Grillage: An assemblage of timber or steel members placed parallel to each other under a sill to spread the load from sill.

Grout or slurry: Neat cement mixed with water to honey-like consistency, it may include pigments if used for grouting joints of tiled floor. Sandstone dust or any other aggregate shall not be added. (Pressure grouting in a specialised engineering process).

Gusset: A plate made of steel, timber, plywood or other material which is nailed or bolted over a member to form or strengthen a joint between them.

Hard Wood: A conventional term used to denote the wood of broad- leaved trees. It has no relationship with the physical properties of hardness or strength.

Haunching: Concrete bedding with additional concrete at the side of the pipe.

Header: A brick laid with its length across the wall.

Hip: The outer angle (more than 180°) formed by the inclined ridge between two intersecting roof slope.

Hydrated Lime: The lime containing small quantities of silica and alumina (with or without iron oxide) which are in chemical combination with some of the calcium oxide content giving a putty or mortar which has the property of setting and hardening under water.

Hydraulic Hydrated Lime: The dry product obtained by the hydration of hydraulic or semi-hydraulic lime in such a way as to permit the hydration of calcium oxide and magnesium oxide (if present) but leaving the hydraulic constituents unhydrated to enable the development of hydraulic properties.

Indenting: The leaving of recesses into which future work can be bonded.

Invert: The lowest point of the interior of a sewer or drain at any cross-section. In a manhole chamber, the channel in the floor of the chamber which carries the flow of sewage through the manhole.

Joist: A beam directly supporting floor, ceiling or roof of a structure.

Kankar: The impure earthly stone rich in concretions and nodules of calcium carbonate.

Knot: A branch base or limb embedded in the three or timber by natural growth.

Lacing: Horizontal or inclined members which hold together in position props or other vertical supports.

Lagging: Narrow timbers fixed to a shaped frame for forming curved surfaces.

Lime: A general term which includes the various chemical and physical forms of quick-lime, hydrated lime and hydraulic lime commonly obtained by calcination and/or calcination and hydration, from line stone or other calcarious materials.

Lime Putty: A wet plastic paste consisting of hydrated lime and free water.

Load Bearing Wall: A wall designed to carry an imposed vertical load in addition to its own weight.

Local: The word 'local' when used with reference to material/article shall mean the best of its kind available and used in the locality (i.e. within a distance of 25 km from the boundary of the site of work)

Manhole: An opening by which a man may enter or leave a drain, a sewer or other closed structure for inspection, cleaning and other maintenance operations, fitted with a suitable cover.

Matrix: The binding constituent of the top layer of the tile which is chiefly portland cement, either plain or mixed, with pigments.

Mitred Joints: A joint between two members at an angle in which the jointing surfaces are cut to corresponding edges at the intersection.

Mud: A mixture of soil and water in a fluid or weakly solid state.

Mud Phuska: Roof finish with soil mixed with binding and reinforcing ingredients.

Optimum Moisture Content: That moisture content at which a specified amount of compaction will produce the maximum dry density in a soil; it is expressed as a percentage by weight of the dry soil.

Pallet: A flat timber or metal plate on which precast concrete units are cast and handled until they have hardened.

Panels: Regular patterns of the parquet floor having large areas and laid in symmetrical designs.

Perpend: An alignment of cross-joints which can be checked with a plumb line.

Pitched Roof: A roof the pitch of which is greater than 10 to horizontal.

Plank: A piece of sawn timber whose thickness does not exceed 5 cm. but the width exceeds 5 cm.

Plastering: The term plastering shall cover all types of rough or fair finished plastering, rendering, floating and setting coats, screed etc. in mud, lime, cement lime, cement sand, lime flyash or cement flyash.

Plum: A large random shaped stone embedded into freshly places mass concrete.

Post: A general term for timber used in an upright position in building, fencing or other structural work.

Potable Water: Water which is satisfactory for drinking, culinary and domestic purposes, and meets the requirements of the Health Authority having jurisdiction.

Pozzolana: An essentially silicious material which while in itself possessing no cementitious properties will in finely divided form and in the presence of water, react with calcium hydroxide at ordinary temperature to form compounds possessing cementitious properties.

Profile: A guide used for setting out brickwork accurately.

Puff Ventilation: The ventilation provided for waste traps in two pipe system, in order to preserve the water seal.

Purlin: Structural members spanning between pitched roof trusses or partly walls and transmitting the weight of the roof coverings to the trusses or partly walls.

Quick-lime: A calcined material, the major part of which is calcium oxide or calcium oxide in natural association with a lesser amount of magnesium oxide, capable of slaking with water. This is also known as un-slaked lime.

Quoin: An external corner in brickwork, the term may also denote the masonry unit used to form the quoin.

Racking Back: Stepping of the unfinished end of the wall masonry.

Rails: Horizontal members of shutters of doors, windows panels or fencing.

Reeper: A batten used in roof construction.

Rendering: It shall mean the plaster coat which is applied following the dubbing out where required, or the final coat in case of one-coat work.

Resin: A natural or synthetic, solid or semi-solid organic material of indefinite and often high molecular weight having a tendency to flaw under stress, usually has a softening or melting range and usually fractures conchoidally.

Reveal: The visible part of each side of a recess or opening of a wall.

Ridge: The horizontal intersection of the two rising roof surfaces inclined in opposite direction.

Rubble: Rough stone of irregular shape and size, broken from larger masses by geological process or by quarrying.

Saddle: A purpose-made fitting, so shaped as to fit over a hole cut in a sewer or drain, and used to form connections.

Sand: a) Granular material passing the 10 mm IS sieve and almost entirely passing the 4.75 mm IS sieve and predominantly retained on the 75 micron IS sieve, and resulting from natural disintegration and abrasion of rock or processing of completely friable sandstone; or

b) That portion of an aggregate passing the 4.75 mm IS sieve and predominantly retained on the 75 micron sieve and resulting from natural disintegration and abrasion of rock or processing of completely friable sandstone.

Sapwood: The outer layers of the log, which in the growing tree contain living cells and food material. The sapwood is usually lighter in colour and is readily attacked by insects and fungi.

Scaffolding: A temporary structure for gaining access to higher levels of the permanent structure during construction.

Scantling: A piece of timber whose cross-sectional dimensions exceed 5 cm but do not exceed 20 cm. in both directions.

Seasoned Timber: Timber whose moisture content has been reduced to the specified minimum, under more or less controlled processes of drying.

Setting Coat: It shall mean final coat in a two or three coat work.

Sewer: A closed drain carrying night-soil and other water-borne waste.

Shake: A partial or complete separation between adjoining layers of tissues or seen in end surfaces.

Shingle: Rounded or water-borne stone of irregular size occurring in river beds or open beaches.

Sheeting (Sheating): The part of the form which is in contact with the concrete.

Site: The site shall mean the land and/or other places on, into or through which work is to be executed under the contract or any adjacent land, path or street through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.

Silt: A granular material resulting from the disintegration of rock, with grains largely passing a No. 200 (47 micron) Sieve alternatively such particles in the range from 2 to 50 microns diameter.

Slump: A measure of consistency of freshly mixed concrete mortar or stucco equal to the subsidence measured to the nearest 6 mm of the moulded truncated cone immediately after removal of the slump cone.

Soffit: 1) The undersides of slabs, beams, staircases, etc.

2) The highest portion of the interior of a sewer or drain at any cross-section.

Soil Waste: The discharge from water closets, urinals, slop sinks, stable or cowshed gullies and similar appliances.

Spall: A fragment, usually in the shape of a flake, detached from a larger mass by a blow, by the action of weather, by pressure, or by expansion within the larger mass.

Split: A crack extending from one face to another face in the wooden member.

Storm water: It is the surface run off following rainfall, which enters sewers through inlets.

Stretcher: A brick laid with its length in the direction of wall.

Strut: A structural member used for carrying compressive stress.

Style: A vertical member of shutter frame.

Stud: A vertical or horizontal stiffener to the back of the form sheeting.

Surface water: Free water retained on surfaces of aggregate particles and considered to be part of the mixing water in concrete, as distinguished from absorbed moisture.

Surkhi: The coarse powder obtained by pounding of bricks and used as an aggregate as well as a pozzolanic material. It is obtained as a bye-product of the brick industry.

Super-elevation Banking or Cent: The inward tilt or transverse inclination given to the cross-section of a carriage way on a horizontal curve to reduce the effects of centrifugal force on a moving vehicle.

Surface Dressing: This shall comprise of vegetation and trimming of uneven surface of natural ground to a uniform surface (either horizontal or sloping), by scraping off high patches and filling in the low patches with the scraped soil. The maximum depth of cutting shall not exceed 15 cm.

Sub-Floor: A structural floor upon which a base is formed.

Tar: A viscous material having adhesive properties and resulting from the destructive distillation of organic material. The word 'Tar' should be preceded by the name of the material from which it is produced, coal, shale, peat, vegetable matter, etc. its mode of production shall also be indicated.

Terrazzo floor: The floor finish where the wearing surface is normally composed of marble chips in a matrix of cement with or without pigments and mechanically or manually ground, processed and polished.

Texture: Texture is the degree of fineness and uniformity of a soil and is expressed as floury, smooth, gritty or sharp.

Toothing: Bricks left projecting in alternate courses to bond with future work.

Tongue and Groove Joint: A joint in which a tongue is provided on edge of one member to fit into a corresponding groove on the other.

Under-layer: The lower of concrete in the terrazzo finish which occurs below the terrazzo topping.

Valley: The re-entrant angle formed by the inter-section of two inclined roof surfaces.

Waling: A long horizontal member acting as a beam and used in conjunction with form ties, struts or strongbacks to support and prevent movement of forms.

Water content: The proportion of water present in a material expressed as a percentage by weight of the material.

Wedge: A piece of wood or metal tappering to a thin edge, used to adjust elevation, tighten formwork.

Work or works: The expression 'work or works' shall, unless be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract, contract to be executed whether temporary or permanent, and whether original, altered, substituted or additional.

Materials required for different items of works

Sl. No.	Particulars	Quantity	
		Per 100 Cft.	Per 100 Cu.m
1.	Bricks 9" x 4.5" x 3" or 200 x 100 x 100	1350 Nos.	50,000 Nos.
2.	Dry mortar for bricks work - 30%	30 cft.	30 cu.m
3.	Stone for rubble masonry - 125%	125 cft.	125 cu.m
4.	Dry mortar for rubble masonry - 42%	42 cft.	125 cu.m
5.	Brick for brick ballast for lime concrete	1050 Nos.	37000 nos.
6.	Brick bats for brick ballast	105 cft.	105 cu.m.
7.	Brick ballast for lime concrete 106 cft.	100 cu.m.	—
8.	Dry mortar for lime concrete in founds and floors 35%	35 cft	35 cu.m.
9.	Dry mortar for lime concrete for roof terracing - 45%	45 cft.	45 cu.m.
10.	Materials for cement concrete 1:2:4 Ballast or grit 88% Sand 44% Cement 22%	 88 cft. 44 cft. 22 cft.	 88 cu.m. 44 cu.m. 22 cu.m.
11.	Materials for 25 mm (1") C.C. 1:2:4 floor Stone grit Sand Cement	 8 cft. 4 cft. 2.4 cft. (2 bags for %cft.)	 2.4 cu.m. 1.2 cu.m. 0.08 cu.m (23 bags for % sq.m.)
12.	Brick for R.B. Work–	1200 nos. for % cft.	42000 Nos. for % sq.m.
13.	Dry mortar for R.B. Work	45 sft.	45 cu.m
Sl. No.	Particulars	Quantity	
		Per 100 Sft.	Per 100 Sq.m
14.	Dry mortar for 12 mm plaster	6 sft.	2 cu.m
15.	Dry mortar for pointing brick work	2 sft.	0.6 cu.m.
16.	Lime for white washing I coat	0.65 sft.	6.5 kgs.
17.	Dry distemper 1 coat	0.65 kg.	0.5 kg.
18.	Dry distemper 2nd coat	0.5 kg.	5 kg
19.	Snowcem 1 coat	3 kgs.	30 kg.
20.	Snowcem 2nd coat	2 kgs.	20 kgs.
21.	Readymade paint for 1 coat	1/2 gal.	10 ltr.
22.	Paint (stiff) for painting 1 coat	1 kg.	10 kg.
23.	Bricks for half brick wall	500	5000
24.	Dry mortar for above	12 cft.	3.2 cu.m.
25.	Bricks (9" x 4.5" x 3") for brick flat floor	350	3500
26.	Dry mortar for above	8 cft.	2.25 cu.m.
27.	Bricks (9" x 4.5" x 3") for Honeycomb wall	325	3500
28.	Dry mortar for above	8 cft. % sft.	2.5 cu.m. % sq.m.

Sl. No.	Particulars	Quantity	
		Per 100 Sft.	Per 100 Sq.m
29.	Materials for 3/4" (20 mm) D.P.C. in 1/2 CM		
	Cement	3 cft. - 2, 5 bags	0.9 cu.m. - 27 bags
	Sand	6 cft.	1.80 cu.m
30.	Composeal or Impermo @ 1kg. per bag of cement materials for 1" (25 mm) D.P.C. in		
	Cement concrete 1: 1.5 : 3	8 cft.	2.25 cu.m.
	Stone grit	4 cft.	1.12 cu.m.
	Sand Coarse	2.23 cft.	0.75 cu.m.
	Cement	2-1/4 bags	22-1/2 bags
	Composeal or impermo @ 1kg. per bag of cement	2-2/3 kg.	22.1/2 kg.
31.	Bitumen or Asphalt for painting on DPC or on roof		
	1st coat	15 kg.	150 kg
	2nd Coat	10 kg.	100 kg
32.	C.G.I. sheet for roof	128	128 sq.m.
33.	A.C. Sheet Corrugated for Roof	115	115 s.m.
34.	Timber for panelled door shutter 40 mm	15 cft.	4.5 cu.m.
35.	Timber for battoned door shutter 40 mm	13 cft.	4.5 cu.m
36.	Timber for partly panelled and glazed shutter - 40 mm thick	11 cft.	3.0 cu.m.
37.	Timber for fully glazed shutter - 40 mm thick.	8 cft.	2.0 cu.m.

IV TEST REPORT ON MATERIALS

Test Report of Compressive Strength on Bricks

Date of Test :

Technical Reference : IS 3495 (Part I & III) - 1976, Clause 3-1

Sl. No.	Identification	Dimension in cm.	Loaded area in sq.cms.	Crushing Load in tonnes	Compressive strength in kgf/sq.cm.	Remarks

Compressive Strength: The bricks when tested in accordance with the procedure laid down in IS: 3495 (Part 1) 1976 shall have a minimum average compressive strength for various classes as given in Clause 3.1 below.

Note: In case any of the test results for compressive strength exceed the upper limit for the class, the same shall be limited to upper limit of the class for the purpose of averaging.

The compressive strength of any individual brick shall not fall below the minimum average compressive strength specified for the corresponding class of brick by more than 20 percent.

IS 1077-1976

Classes of Common Burnt Clay Bricks
(Clause 3.1)

Class Designation	Average Compressive Strength	
	Note less than kg/cm^2(N/mm^2)	Less than kg/cm^2(N/mm^2)
350	350 (35)	400 (40)
300	300 (30)	350 (35)
250	250 (25)	300 (30)
200	200 (20)	250 (25)
175	175 (17.5)	200 (20)
150	150 (15)	175 (17.5)
125	125 (12.5)	150 (15)
100	100 (10)	125 (12.5)
75	75 (7.5)	100 (10)
50	50 (5)	75 (7.5)
35	35 (3.5)	50 (5)

Test Report of Water Absorption on Bricks

Date of Test :

Technical Reference : IS 3495 (Part I & II) - 1976, Clause 3-1

Sl. No.	Identification	Dimension in cm.	Water absorption % by weight	Average % by weight
1-6				Average of 6

Note: Specifications as per IS: 3495 (Part I & II)- 1976 Clause 3.1 after immersion in cold water for 24 hours, the average water absorption shall not be more than 20% by weight upto class 125 and 15% by weight for higher classes.

Test Report of Efflorescence on Bricks

Date of Test :

Technical Reference : IS 3495 (Part III) - 1976, Clause 3-3

Sl. No.	Identification Mark	Dimension in cm. L x B x H	Determination of Efflorescence

Note: "Nil", when there is no perceptible deposit of efflorescence. The bricks when tested in accordance with the procedure laid down in IS: 3495 (Part III) 1976, Clause 3.3 and the rating of efflorescence shall not be more than "Moderate" upto Class 125 and "slight" for higher classes.

Test Report on Fine Aggregate

Technical Reference : IS 2386-1963 & IS: 383-1990

IS. Sieve Designation	Cumulative Percentage		Specification as per IS: 383-90
	Retained	Passing	
4.75 mm			
2.36 mm			
1.18 mm			
600 microns			
300 microns			
150 microns			
75 microns			

Sieve Analysis of Coarse Aggregate

Technical Reference : IS 2386 (Part I) -1963 & IS: 383:1970

IS Sieve Designation	Cumulative Percentage		Limits as per IS: 383-1970 (Table 2) of nominal size 40 mm	
	Retained	Passing	Graded % passing	Single sized passing % passing
63 mm			0	100
40 mm			95-100	85-100
20 mm			30-70	0-20
10 mm			10-35	0-5
4.75 mm			0-5	—

Fineness Modulus =

Sieve Analysis of Fine Aggregate

Technical Reference : IS 2386 (Part I) -1963 & IS: 383:1970

IS Sieve Designation	Cumulative Percentage		Specification as per IS: 383-1970 (percent passing)			
	Retained	Passing	Zone I	Zone II	Zone III	Zone IV
10 mm			100	100	100	100
4.75 mm			90-100	90-100	90-100	95-100
2.36 mm			60-95	75-100	85-100	95-100
1.18 mm			30-70	55-90	75-100	90-100
600 microns			15-34	35-59	60-79	80-100
300 microns			5-20	8-30	12-40	15-50
150 microns			0-10	0-10	0-10	0-15

Fineness Modulus =

Test Report on Coarse Aggregate

Technical Reference : IS383-1990 & SP 23-1982(BIS)

Tests

Specific Gravity :

Dry Rodded Bulk Density :

Loose Bulk Density :

Water Absorption :

Test Report on Fine Aggregate

Technical Reference : IS383-1990 & SP 23-1982(BIS)

Tests

Specific Gravity :

Loose Bulk Density :

Dry Rodded Bulk Density :

Test Report on Chemical Test on Fine Aggregate

Sl. No.	Test Conducted	Results	Remarks
1.	Deleterious Material		
	a) Coal and Lignite		Shall not be more than 1%
	b) Clay		Shall not be more than 1%
	c) Materials finer than 75 microns		Shall not be more than 1%
	d) Shale		—
2.	Alkali Aggregate Reactivity		
	a) Reduction in alkalinity (Millimoles/ltr. of 1 N Na OH)		
	b) Silica dissolved (millimoles/ltr)		
3.	Soundness		
	a) 10% Na_2So_4 Solution (% wt. loss)		
	b) 15% $MgSO_4$ solution (% wt. loss)		
4.	Chlorides as Cl (%)		
5.	Sulphates as SO_4 (%)		
6.	Phosphates as PO_4 (%)		
7.	PH		
8.	Specific Gravity		

Test Report on Hollow Blocks

Technical Reference : IS 2185-1979

Compressive strength tests on Hollow Blocks supplied for testing has been carried out as per the guidelines of IS-516 2135-1979

Sl. No.	Dimensions L x B x H	Identification Mark on specimen	Grade of concrete	Date of casting	Age at test days	Cross sectional area (sq.mm)	Max. load in tonne	Compressive strength in kg/sq.cm.	Remarks

Test Report of Water absorption on Hollow Blocks

Technical Reference : IS 2185(P-1)/1979

Water Absorption tests on Hollow Blocks has been carried out as per the guidelines of IS-516 2135-1979

Sl. No.	Identification	Dry Weight	Dimensions in mm.	Wet Weight	% of water absorption

Test Report of Density on Hollow Blocks

Technical Reference : IS 2185(P-1)/1979

Sl. No.	Identification	Dimensions in cms. L x B x H	Weight in kgs.	Block density in kg/cu.m.

Test Report on Solid Blocks

Technical Reference : IS 2185/1979

Sl. No.	Dimensions	Identification Mark on specimen	Grade of concrete	Date of casting	Date of testing	Age at test days	Cross sectional area (sq.mm)	Max. load in ton	Compressive strength in kg/sq.cm.	Remarks

Test Report of Water absorption on Solid Blocks

Technical Reference : IS 2185(P-1)/1979

Sl. No.	Dimensions in cm.	Dry Weight	Wet Weight	% Water Absorption

TESTS

.Test Report on Mosaic Tiles

Technical Reference : IS 1237-1980

a) Flatness Test

Sl. No.	Identification	Dimensions L x B x T (mm)	Maximum convexity/concavity (mm)	Requirements as per IS: 1237-1980
				When six full size tiles tested the maximum convexity/concavity shall not exceed 1 mm.

b) Water Absorption Test

(Ref: Appendix "D" Clause 11.4 of IS: 1237: 1980)

Sl. No.	Identification	Dimensions L x B x T (mm)	Water Absorption Percentage by weight	Requirements as per IS: 1237-1980
				When six full size tiles tested the average percentage of absorption should not exceed 10%

(c) Wet Traneverse Strength Test

(Ref: Appendix 'E' Clause 11.5 of IS: 1237-1980)

Sl. No.	Identification	Dimensions L x B x T (mm)	Wet Transverse Strength (N/sq.mm)	Requirements as per IS 1237-1980
				When six full size tiles are tested, the average wet transverse strength should not be less than 3N/mm^2 (30 kg/cm^2)

(d) Abraison Resistance Test

(Ref: Appendix 'F' Clause 11.6 of IS: 1237-1980)

Sl. No.	Identification	Dimensions L x B x T (mm)	Wear due to abrasion (mm)	Requirements as per IS 1237-1980
				For General purpose
				a) When six full size tiles tested, the average wear shall not exceed 3.5 mm
				b) Wear on individual sample shall not exceed 4.0 mm
				For Heavy Duty Tiles
				a) When six full size tiles tested, the average wear shall not exceed 2 mm.
				b) Wear on individual sample shall not exceed 2.5 mm

Test Report – Analysis of Water Sample

Technical Reference : IS 456-1978

Results for suitability of Water for concreting

Sl. No.	Identification	Constituent determined	Stipulations of IS: 456-1972
1.	Quantity of 0.1 N NaOH required to neutralize 200 ml. of water sample using phenolpthalein as an indicator (ml)		Shall not be more than 2 ml.
2.	Quantity of 0.1 HC1 required to neutralize 200 ml. of water sample using methyl orange as indicator		Shall not be more than 10 ml.
3.	Inorganic solids (ppm)		3000 max.
4.	Sulphates as SO4		500 max.
5.	Chlorides as Cl (ppm)		1000 max. for RCC 2000 max. for PCC
6.	Suspended solids (ppm)		2000 max.
7.	Organic Solids		200 max.
8.	PH value		shall not be less than 6

Test Report of Analysis of Water Sample

Technical Reference : WHO Drinking Water standard

Report of Portability of Water

Sl. No.	Particulars	Constituent determined	Max. permissible as per WHO Drinking water standards (ppm)
1.	Total Hardness as $CaCO_3$		550
2.	Permanent hardness as $CaCO_3$		—
3.	Temporary hardness as $CaCO_3$		—
4.	Calcium as Ca		200
5.	Magnesium as Mg		150
6.	Chlorides as Cl		600
7.	Sulphates as SO_3		400
8.	Dissolved solids		1500
9.	Suspended Solids		—
10.	Nitrates as NO_3		45
11.	P-Alkalinity as $CaCO_3$		—
12.	MD Alkalinity as $CaCO_3$		—
13.	Turbidity		—
14.	Iron as Fe		1
15.	Potassium as K		—
16.	Sodium as Na		—
17.	PH Value		6.5 – 9.2
	Micro-biological tests		
	MPN Coliform Index		20 per 100 ml
	Plate Count		100 per 100 ml

Test Report on Wood Sample

Technical Reference IS : 287-1973

		Results		
Sl. No.	Test Conducted	Sample No. 1	Sample No. 2	Sample No. 3
1.	Moisture Content			
2.	Classification of Wood			
3.	Sample Identification			

TESTS

Test Report on Pressed Clay Tiles

Technical Reference 2690-1975 (Part I)

I. Flexural Strength:

Sl. No.	Dimensions L x B x T (mm)	Flexural Strength	Requirements as per Cl. 5.1 of IS: 2690-1975
1.			The average flexural strength of the tiles when described in Appendix 'B' shall not be less than 15 kg/sq.cm.
2.			
3.			
4.			
5.			
6.			

II. Water Absorption

Sl. No.	Dimensions L x B x T (mm)	Water absorption % by weight	Requirements as per IS: 2960-1975
1.			The average water absorption when tests as per the Appendix 'A' of IS: 2690-1975 shall not exceed 15%.
2.			
3.			
4.			
5.			
6.			

Test Report on Marble Samples

Technical Reference : IS 1130-1969 & IS: 1121-1974

Sl. No.	Dimensions L x B x T (mm)	Tests conducted	Results	Remarks
1.		Hardness		Minimum 3 in MHOS Scale
2.		Hardness		
3.		Hardness		
4.		Specific Gravity		Minimum 2.5
5.		Specific Gravity		
6.		Specific Gravity		
7.		Water Absorption		
8.		Water Absorption		
9.		Water Absorption		
10.		Moisture Absorption		Max. 0.47 by weight after 24 hrs immersion in cold water
11.		Moisture Absorption		
12.		Moisture Absorption		

Test Report on Aluminium Sections

Technical Reference : IS: 1868-1982 (AC-15) Grade & IS-5523-1983

Sl. No.	Dimensions L x B x T (mm)	Thickness of Anodic Coating
1.	S.No. 1 Plain Section	
2.	S. No. 2 - Two Track Cutter	

Test Report on Ceramic Tiles (Glazed Tiles)

Technical Reference : IS: 777-1988

I. Water Absorption

Sl. No.	Dimensions L x B x T (mm)	Water Absorption % by weight	Stipulation as per IS: 777-1988
1.			The average water absorption of the tiles when six tiles are tested and evaluated in accordance with clause 7.1 shall not exceed 18%.
2.			
3.			
4.			
5.			
6.			

2. Impact Strength

Sl. No.	Dimensions L x B x T (mm)	Impact Strength	Stipulation as per IS: 777-1988
1.			After undergoing impact test, the tiles shall not develop any cracks, when tested and evaluated in acordance with clause 7.7.3 of IS 777-1988.
2.			
3.			
4.			
5.			
6.			

3 Crazing Test

Sl. No.	Dimensions L x B x T (mm)	Observed after		Stipulation as per IS: 777-1988
		I cycle of testing	II cycle of testing	
1.				After undergoing two cycle of crazing test, the tiles shall not show any sign of crazing when tested and evaluated in accordance with clause 7.2 of I.S. 777-1988
2.				
3.				
4.				
5.				
6.				

Report on Physical Tests on Cement (43 Grade)

Technical Reference : IS 4031-1988

Sl. No.	Test Conducted	Result	IS: 8112-1987 Stipulations with all amendments upto date	Remarks
1.	Normal Consistency		Not specified	
2.	Initial Setting		Shall not be less than 30 minutes	
3.	Final Setting Time		Shall not be more than 600 minutes	
4.	Compressive Strength			
	a) 72 ± (average of three results) 3 days		Shall not be less than 230 kg f/sq.cm.	
	b) 168 ± 2h (average of three results) 7 days		Shall not be less than 330 kg f/sq.cm.	
	c) 672 ± 4h (average of three results) 28 days		Shall not be less than 430 kg f/sq.cm.	
5.	Fineness (by Blaine's air-permeability method)		Shall not be less than 2250 sq.cm./g.	
6.	Soundness: (by Le-Chatlier's Method)		Shall not be more than 5 mm for aerated sample.	

Chemical Analysis on Cement Sample

Technical Reference : IS 8112-1989

Sl. No.	Constituents	Result	Remarks
1.	Silica (SiO_2)		Permissible range 19-24%
2.	Alumina (Al_2O_3)		Permissible range 3-6%
3.	Iron Oxide (Fe_2O_3)		Permissible range 1-4%
4.	Magnesia (MgO)		Shall not be more than 6%
5.	Lime (CaO)		Permissible range 59-64%
6.	Sodium Oxide		—
7.	Potassium Oxide (K_2O)		—
8.	Loss on Ignition		Shall not be more than 4%
9.	Sulphur Anhydride (SO3)(% by mass)		Shall not be more than 3.0% when C_3A by mass is 5 and above
10.	Free Lime		—
11.	Insoluble Residue (% by mass)		Shall not be more than 2%
12.	Ratio of % Lime to % Silica aluminate & Iron oxide when calculated according to the formula given in IS: 8112-89		Shall not be more than 1.02 and not less than 0.66
13.	Ratio of percentage of alumina to that of iron oxide		Shall not be less than 0.66
14.	Tri-calcium aluminate		—

Test Report on Panelled Door Shutter

Technical Reference : IS 1003 (Part I) - 1991, IS: 287-1973 and IS: 303-1989

Sl. No.	Test Carried Out	Result	Requirements
1.	a) Dimension (m.m.)		
	i) Height ii) Width iii) Thickness		
	b) Width of the Rails (mm)		
	i) Bottom ii) Lock iii) Top		
	c) Width of the stiles (mm)		
	d) Construction of Workmanship		
	e) Species		
	f) Finish		
2.	Spot test for Preservative Treatment		
3.	As per Appendix A-1 of IS:287-1973, Moisture content of stiles and rails		Shall be in the range of 8 to 14%
4.	As per IS: 303-1989		
	a) Moisture Content		Shall be in the range of 5 to 15%
	b) Glue Shear strength in dry state (N)		
	i) Average ii) Minimum Individual		1350 1100
	c) Resistance to moisture (After 8 hours boiling)		
	i) Average ii) Minimum individual		1000 800
	d) Resistance to micro-organisms		
	i) Average ii) Minimum Individual		1000 800

Test Report on Concrete Cubes

Dimensions of Specimen:

Compressive strength test on concrete cube specimens supplied for testing has been carried out as per the guidelines of ISL: 516- 1959 and the results are tabulated below.

Sl. No.	Description	Identification Mark on specimen	Grade of concrete	Date of casting	Date of Testing	Age at test ** days	Cross sectional area (sq.m.m.)	Maximum Load (Tonnes)	Compressive Strength (Kg./Sq.m.m.)	Remarks

Note: 1 N/sq.mm - 10 kg/sq.cm. (approx)

Test Report of Steel

Specification: IS: 1786-1985

Date of Test

Sl. No.	*Identification	Dim. mm.	Chemical Composition %				Deformation Geometry Bond	Sectional Weight kg/m	0.2% proof stress/yeild N/mm^2	U.T.S. N/mm^2	Elongation %	Bond Test	Rebend Test	Remarks
			C	S	C	E								

*Weight range for 16 mm is 1.500 kg/m to 1.658 kg/m for 20 mm is 2.393 kg.m to 2.541 kg/m and for 25 mm is 3.739 kg/m to 3.971 kg/m as per IS 1786-1985 requirements of Fe - 415 Grade

'Weight range as per IS 1786-1985 requirements of Fe - 415 Grade

16 mm = 1.500 kg/m to 1.658 kg/m

20 mm = 2.393 kg/m to 2.541 kg/m

25 mm = 3.739 kg/m to 3.971 kg/m

V RATE ANALYSIS

OSTS OF BASIC MATERIALS SUCH AS CEMENT ,STEEL, BRICKS, SAND, JELLY ETC.HAVE BEENASSUMED TO IN THE WORKING DETAILS TO ARRIVE AT THE RATE FOR EACH ITEM.THE READER IS REQUESTED TO ADOPT REVAILING MARKET RATE AT THE CONSTRUCTION SITE TO GET THE UNIT RATE FOR EACH ITEM.

1 EXCAVATOR

Description of Item	Quantity	Rate	Per	Amount (Rs.)
Earth work in excavation in trenches for foundations and for pipes, cables etc. not exceeding 1.5 m width for shafts, wells, cess pits and the like not exceeding 10 sq.m. in plan, including dressing of sides and ramming of bottoms, lift upto 1.5 m., including getting out the excavated soil and disposal of surplus excavated soil as directed within a lead of 50 mtr.				
Disposed soil to be levelled and neatly dressed.				
Loose or soft soil:				
Details of cost for 10 cu.m.				
Labour				
Mazdoor Category I	2.00 No.	75.00	each	150.00
Mazdoor Category II	1.67 No.	55.00	each	91.85
ADD: for water charges @1%			L.S.	2.42
Contractor's profit @10% on 241.85			L.S.	24.19
				268.46
Cost per cu.m. 26.85 or say Rs. 27				
Mud				
Details of cost for 10 cu.m.				
Labour				
Mazdoor category I	3.53	75.00	each	264.75
Mazdoor category II	2.75	55.00	each	151.25
Add for water charges			L.S.	4.16
Add for contractor's profit @ 10% on 416.00			L.S.	41.60
				461.76
Cost per cu.m. = 46.17 or say 47				
Extra for every additional lift of 1.5 mm or part there of:				
Loose/soft or denser/hard soil				
Costs for 10 cu.m.				
Labour - Mazdoor category II	0.40 No.	55.00		22.00
Add 1% for working class				0.22
Add 10% for contractor's profit				2.20
				24.42
Cost for one cubic metre = 2.43 or say Rs. 2.50 per cu.m.				
Spreading the surplus excavated earth, if it is of acceptable quality within the site				
Cost for 10 cu.m.				
Labourer				
Mazdoor Category I	0.89	75.00	each	66.75
Mazdoor Category II	0.80	55.00	each	44.00
Head Mazdoor	0.35	90.00	each	31.50
				142.25
Add water charges @1%				1.42
Add for contractor's profit @ 10%				14.23
				157.90
or say Rs. 15.80/- per cu.m.				

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
e)	Transporting surplus excavated materials outside the site and dumping the same at the local authorities approved place.				
	Cost for one cubic metre				
	Transporting excavated earth by mechanical transport including loading and unloading charges with rate upto 5 km.	1 cu.m.	400	4.2 cu.m.	73.24
	From km. to 10 km. @ Rs. 5/- extra			L.S.	25.00
					118.24
		5 km.	10 km.		
	Water charges @ 1%	93.24	118.24		
		0.93	1.18		
	Contractor's profit @ 10%	9.32	11.82		
		103.49	131.24		
	or say Rs. 105/- per cu.m.				
	Upto 5 km. - Rs. 105/- per cu.m.				
	Upto 10 km. - Rs. 131/- per cu.m.				
2.	Opening timbering in trenches including use of waste of all necessary timber west, including wells, streets, open polling boards/horizontal sheathing etc. as may be necessary and fixing and removal complete (measurement to be taken)				
	Depth not exactly 1.5 m.				
	Details of cost for trench of length				
	30 m and 1.5 m deep - surface	90 sq.m.	13000	cu.m.	14820.00
	Polling boards	1.140 cu.m.		cu.m.	15600.00
	Walling	1.20 cu.m.		cu.m.	765.00
	Ballies struts 125 mm dia and 1.5 m long	51 m	15	r.m.	765.00
					31333.05
	Carriage: Deduct resale value after using as fine wood	25%			7833.26
	Cost for one cu.m.				23499.79
	Labour				
	Carpenter II class	0.25 No.	100	each	25.00
	Mazdoor category I	0.5 No.	75	each	37.00
	Add for water charges @ 1%			L.S.	59.37
	Contractor's profit @ 10%			L.S.	593.75
					6590.61
	Cost per square metre $\frac{6590.61}{90}$ = Rs. 73.23				
	or say Rs. 75/- per sq.m.				
3.	RCC under reamed pile				
	Providing cast in situ with RCC 5.5 m and 37 mm				
	Details cost for one pile				
	RCC (1:1 1/2:3)	1.031 cu.m.	2525	cu.m.	2603.28
	Labour for drilling, making reams, mixing and laying of concrete and placing reinforcement	5.8 m.	328	metre	1902.40
	Cost for bentomite solution			L.S.	119.32
					4700.00
	Water charges @ 1%			L.S.	47.00
	Contractor's profit @ 10%			L.S.	470.00
					5217.00
	Cost for one pile = Rs. 5217/-				

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	Pest Control Treatment				
	Supplying, providing and applying anti-termite pre-construction chemical treatment				
	Chloropirous emulsifiable				
	Concrete	0.5%			
	Details of cost for 9 sq.m. of plinth area	9.25	240.00	litre	2220.00
	Male mazdoor-category I	170 Nos.	75.00	each	127.50
	Sundries, rent for sprayer, etc.			L.S.	12.50
					2360.00
	Water charges @1%				23.60
	Contractor's profit @10%				236.00
					2619.60

Filling

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
1.	Providing, supplying and laying clean river sand filling in foundations and below plinth in layers not exceeding 150 mm thickness with watering, ramming, consolidating complete 10 cu.m.				
	River sand	10 cu.m.	189	cu.m.	1890.00
	Maistry	0.07	100	each	77.00
	Mazdoor category I	0.89	75	each	64.75
	Mazdoor category II	1.47	55	each	80.85
	Sundries			L.S.	55.40
					2100.00
	Water charges @1%				21.00
	Contractor's profit @ 10%				210.00
					2331.00
	Cost/cu.m. = Rs. 233.10 or say Rs. 235/-				
2.	Same as above except in place of river sand, pit sand is usedfor filling.				
	The difference in cost is to be subtracted.				
	Cost of river sand	1 cu.m.	189	cu.m.	189
	Cost of pit sand	1 cu.m.	105	cu.m.	105
					84

2 Mortars

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
1.	Cement mortar (1:2) cu.m.				
	Cement	680 kg.	175	bag	2380.00
	Sand	1.07 cu.m.	189	cu.m.	202.23
	Mixing Mortar				
	Mazdoor Category I	0.6	75	each	45.00
	Mazdoor Category II	0.3	55	each	16.50
	Sundries			L.S.	6.50
	Water charges			L.S.	26.50
					2676.73
				or say Rs.	2680 cu.m.
2.	Cement Mortar (1:3) - 1 cu.m.				
	Cement	510 kg.	175	kg.	1785.00
	Sand	1.07	189	cu.m.	202.23
	Mixing mortar	1 cu.m.	71	cu.m.	71.00
	Sundries			L.S.	1.77
	Water charges			L.S.	20.60
					2080.60
				or say Rs.	2081/ cu.m.
3.	Cement Mortar (1:4) - 1 cu.m.				
	Cement	380 kg.	175	bag	1330.00
	Sand	1.07 cu.m.	189	cu.m.	202.23
	Mixing Mortar	1 cu.m.	71	cu.m.	71.00
	Sundries			L.S.	6.07
	Water charges			L.S.	16.00
					1626.30
4.	Cement Mortar (1:5) - 1 cu.m.			or say Rs.	1626/ cu.m.
	Cement	310 kg.	175	bag	1085.00
	Mortar	1.07 cu.m.	189	cu.m.	202.23
	Mixing mortar	1 cu.m.	71	cu.m.	71.00
	Sundries			L.S.	1.77
	Water charges			L.S.	13.60
					1373.60
				or say Rs.	1374/cu.m.
5.	Cement mortar (1:6)				
	Cement	247 kg.	175	bag	865.00
	Sand	1.07 cu.m.	189	cu.m.	202.23
	Mixing mortar	1 cu.m.	71	cu.m.	71.00
	Sundries			L.S.	1.77
	Water charges			L.S.	12.00
					1152.00

Description of Item	Quantity	Rate	Per	Amount (Rs.)
Concrete broken stone on cement mortar 1:4 (one part cement and four parts coarse sand) using 40 mm size hand broken stone aggregate – 10 cu.m.				
40 mm size broken stone aggregate	9.6 cu.m.	298	cu.m.	2860.80
Cement mortar (1:4)	5.0 cu.m.	1626	cu.m.	8130.00
Mason II class	1.8 Nos.	100	each	180.00
Mazdoor category	17.7 Nos.	75	each	1327.50
Mazdoor categroy II	14.1 Nos.	55	each	775.00
Sundries for mixer hire charges and rent for miscellaneous, etc.			L.S.	406.20
				13680.00
Water charges @ 1%				136.80
Contractor's profit @10%				1368.00
				15184.80
Cost of 1 cubic metre of concrete =Rs. 1518/-				
Concrete broken stone (20 mm size) in cement mortar for reinforced cement concrete work - mix (1:2:4) - 1 cu.m.				
Rate for 10 cu.m.				
20 mm size broken stone	9 cu.m.	464	cu.m.	4176.00
River sand (coarse)	4.5 cu.m.	189	cu.m.	850.50
Cement	9231 kg.	175	bag	11308.50
Mason II class	3.5 Nos.	100	each	350.00
Mazdoor category I	21.2 Nos.	75	each	1590.00
Mazdoor category II	35.3 Nos.	55	each	1941.50
Sundries for hire charges of mixer machine and miscellaneous items including vibrator				483.50
Water supply charges @ 1%			L.S.	207.00
Contractor's profit @ 10%			L.S.	2070.00
				22977.00
Cost per cubic metre = 2297.70 or say rs. 2298				
Concrete (1:1 1/2:3)				2298.00
Cost of (1:2:4) concrete -1 cubic metre				
Add the difference in costs of cement per cubic metre of concrete 4.00 (–) 3.20 = 0.8 quintal	80 kg.	175	per bag	280.00
				2578.00
Cost of (1:1 1/2:3) concrete = 2578 per cu.m.				

Centering and Strutting Cost Analysis

Sl. No.	Description of work	Quantity	Rate/per sq.m.	Amount in Rs.	
	Scaffolding Centering etc.				
	Providing two legged scaffolding using 15 cm. diameter blue gum posts or casuarina posts or best quality bamboo posts of 4m. overall length (3 m. height + 0.5 m. projection + 0.5 m. into the ground) the distance between the two rows being 1.25 m. and the spacing of posts being 2m. in both the rows with two horizontal posts with 0.5 m. overlap on either side and braces at 2 m. c/c including longitudinal and transverse middle braces to step up and providing a platform with country wood planks of 40 mm thick and 1 m. width, etc. in a complete form using coir and nails 1 m. run.				
	Rate for 6 m. run				
	15 cm. dia. posts (blue gum posts or casuarina or bamboo posts)	70 m run	15/mtr	1050	
	Country wood planks	0.3 cu.m.	13000/cum	3900	
				4950	A
	Materials can be used for 10 times				
	Cost per operation A/10			495	B
	Cost materials for one operation			495	
	Mazdoor category 1	2 Nos.	75/each	150	
	Coir, nails, etc.		LS	24.75	
	Total for 6 m. run			669.75	C
	Rate for one meter run $\frac{669.75}{6}$			111.66	
	Rate for scaffolding for height of 3 m. and length of 1 m.		or	112.00	D

1	2	3	4	5	
	For every additional height of 2.5 m taking 6 m. run				
	Extra materials required $= \frac{70 \times 2.5}{3}$	58 rm	15.00/rm	870.00	
	Country wood planks $= \frac{0.3 \times 2.5}{3}$	0.25	13000/cum	3250.00	E
				4120.00	
	Cost per operation - E/10			412.00	
	Mazdoor category	2 Nos.	75.00	150.00	
	Coir, nails, etc.		LS	20.60	
	Total cost for 6 m. run			582.60	G
	Cost for 1 m. run and every additional height of 2.5 m. - G/6			97.10	
	Water charges @1%			0.97	
	Contractor's profit @10%			9.71	
				107.78	H
	Centering for soffits of reinforced cement concrete slabs or plane surfaces including strutting 3 m. - height 10 sq.m. No.				
	Country wood boarding 40 mm thick	0.4 cum	13000/cum	5200.00	
	Country wood joists	0.12 cum	13000/cum	1560.00	
	Casuarina props 10 to 13 cm. diameters at 75 cm. centres	98.5 rm.	15.00/rmt	1477.50	
	Total			8237.50	P
	Cost of materials for one operation P/20			411.88	
	Carpenter I class	3.8 No.s	120/each	456.00	
	Mazdoor category I	5.4 Nos.	75/each	405.00	
	Wedges	21.5 Nos.	10/each	215.00	
	Nails, coir, etc.	L.S.		42.53	
				1530.41	
	Water charges 1% of 1530.41	L.S.		15.30	
	Contractor's profit @10%	L.S.		153.04	
				1698.75	
	Cost for 1 sq.m. Rs. 170 - Q			1700.00	Q

1	2	3	4	5	
	Struttings to centerings of reinforced cement concrete slabs or plane surfaces upto 3 m. height - 10 sq.m.				
	Casuarina props 10 to 13 cm. diameters at 75 cm. centres and braces	98.5 RM	15/rm	1477.50	
				1477.50	R
	Cost of materials				
	Cost of materials for one operation B/5	$\frac{1477.50}{5}$		295.50	
	Carpenter - Class I	0.3 Nos.	120/each	36.00	
	Mazdoor, Category I.	0.3 Nos.	75/each	22.50	
	Nails, coir, etc.		L.S.	17.70	
				371.20	
	Water charges 1%			3.72	
	Contractor's profit @10%			37.17	
				412.59	
	Struttings to centerings of reinforced cement concrete slabs or plane surfaces for every additional 1m. height or part thereof but not less than 30 cm. over the initial 3 m. height 10 sq.m.				
	Rate for 1 m. height or part thereof out of not less than 30 cm. 1/3 of the rate as above 10 sq.m. $\frac{412.59}{3}$			137.53	
	Centering and shuttering charges to soffit of concrete slabs and plane surfaces including strutting to 3.66 metre height. For 10 sq.m.	10 sq.m.	170/sq.m.	1700	
	Additional charges for 0.66 m. height	0.66	137.50/sqm.	137.53	
				1837.53	
	Cost per sq.m.	Rs. 183.75			
	Cost Analysis for RCC Column Concrete (1:1 1/2:3) Area of maximum size of columns - 0.30 x 0.75 for centering work Area of the column base - 0.30 x 0.75 = 0.225 sq.m. Height of the column for one metre of concrete $= \frac{1}{0.225} = 4.44$ rm Centering area of the column box = 2 (03 + 0.75) x 444 = 10.656 sq.m.		4.44 rm		
	Cost of 1 cu.m. of (1:1 1/2:3) cement	1 cu.m.	2578/cum	2578.00	
	Cost of centering are	10.656	40.80/sq.m.	434.76	
				3012.76	
			or say Rs.	3013.00	cu.m.

1	2	3	4	5
	Cost Analysis for Shuttering for column			
	Shuttering and providing supports to columns for 10 sq.m.	$\frac{Q \times 120}{100}$	$\frac{1700 \times 120}{100}$	2040
	Rate for 10 sq.m. = 20% of 2040		$\frac{2040}{5}$	408
	Cost per sq.m.			40.80
	RCC sunshade - Average thickness 0.075 m.	1 sq.m.		
	Area required for one cubic metre of concrete	$\frac{1}{0.075}$	13.33 sq.m.	
	Cost of 1:2:4 concrete	1 cu.m.	2298.00	2298.00
	Centering cost	13.33 sq.m.	$\frac{1700 \times 120}{100}$	2719.32
				5017.32
	Cost per sq.m.	$\frac{5017.32}{13.33}$	= 376.39	376 sq.m.
	Cost per sq.m. Rs.			376.00
	RCC Beams - (1:1 1/2:3) - 1 cubic meter			
	Cost of concrete	1 cu.m.	2578 cum	2578.00
	Centering area for 1 cu.m. of concrete	10.45 sq.m.	170/sq.m.	1776.50
				4354.50
	Cost per cu.m.			4355.00
	Centering area for 1 cu.m. of beam concrete			
	For 0.23 x 0.45 beams - Length $\frac{1}{0.1035}$ 9.66 rm x 1.15 = 10.92 sq.m.			10.92
	For 230 mm x 600 mm size beams — Length = $\frac{1}{0.23 \times 0.60}$			
	Area of centering = 7.25 rm x 1.43			10.37 sq.m.
	Length of centering required for 1 cu.m. of concrete of 230 mm x 750 mm beam			
	$L = \frac{1}{0.23 \times 0.75}$ = 5.80 rm - Area of centering = 1.73 x 5.80 = 10.034 sq.m.			
	Average centering area = $\frac{10.92 + 10.37 + 10.03}{3}$ = 10.55 sq.m.			
	RCC Roof slabs (1:2:4) = 175 mm thick - cu.m.			
	Area occupied by 175 mm thickness concrete = $\frac{1}{0.175}$	5.71 sq.m.		
	Cost of one cubic meter of (1:2:4) concrete	1 cu.m.	2298/cum	2298.00
	Cost of centering	5.71 sq.m.	183.75 sq.m.	1049.21
				3347.21
	Cost per cu.m.			3347.00

1	2	3	4	5
	Manufacturing,supplying and fixing in position RCC Pre-cast slab 50 mm thick in cement concrete (1:2:4) with steel reinforcement at 100 mm c/c longitudinally and 6 mm M.S. bars at 150 mm centre to centre transversally, finishing the top and bottom with cement mortar (1:3) - cost per sq.m.			
	Cost of 1 cu.m. of (1:2:4) cement	1 cum	2298	2298 (a)
	Cost of making moulds with second quality teakwood scantling.			
	Cubical content of scantling of one mould for 3.05 m. length and 0.3 m width of slab - 2(3.05 + 0.3) x (0.05) = 6.70 x 0.05 x 0.05 = 0.016 cu.m. = 00.17 cu.m. Add 20% for wastage = 0.003 cu.m. = 0.020 cu.m.	0.020 cu.m.		
	0.02 cu.m. x 42000			840.00
	No. of moulds required for one cu.m. of concrete $\frac{1}{0.05}$ = 20 sq.m. = $\frac{20}{3.05 \times 0.30}$ = $\frac{20}{0.915}$	22 Nos.		
	Assuming the mould can be used for 30 operations			
	The cost/operations = $\frac{840}{30}$			28.00 (b)
	Cost of steel 8 dia. at 10 mm centre to centre longitudinally 4 x 3.05 x 0.395 = 4.82 kg. 6 mm at 150 mm c/c transversally 2 x 0.30 x 0.222 = 1.40 kg. = 6.22 kg. Wastage = 0.78 kg. = 7.00 kg.			
	Total quantity of steel 1 cu.m. of concrete			2326.00 (a+b)
	Cubic content of one slab 3.05 x 0.30 x 0.05 = 0.05 No. of slabs per cubic metre of concrete $\frac{1}{0.05}$ = 20 Nos.			
	Quantity of steel = 20 x 7 = 140 kg. Wastage = 10 kg. 150 kg.	150 kg.	18	2700.00
	Plastering on both sides of the slab in cement mortar (1:2) on both the sides 20 x (3.05 x 0.30 x 2) including wastage	40 sq.m.	5.50	220.00
	Labour charges for the same	20 sq.m	10	200.00
				5446.00
	Cost per sq.m. $\frac{5373}{20}$			268.65
	or say 270 sq.m.			

1	2	3	4	5
	Such rate for plastering the slab on both sides			
	Sub data for plasterng the slab on both the sides			
	Cost of cement mortar (1:3) = Rs. 2081/- per cu.m.			
	Quantity of motar consumed in plastering the slab on both side to 12 mm thick quantity of mortar required for one slab 2 x 3.05 x 0.30 x 0.012 = 0.0048 cu.m.			
	Cost of cement mortar (1:3) = 2081 per cu.m. Quantity of mortar consumed in plastering the slab on both side to 12 mm thick quantity of mortar required for one slab 2 x 3.05 x 0.3 x 0.012 = 0.0048 cu.m.			
	20 slabs = 0.0048 x 20 = 0.096 x 2081 = 199.78			
	Area of 20 slabs = 2 x 3.05 x 0.30 x 20 = 36.60 sq.m. or 37 sq.m.			
	Cost per sq.m. = $\frac{199.78}{36.60}$ = 5.45 or say Rs. 5.50 sq.m.			

Note: Bar bending part work does not involve the operation of bending, lifting and placing in position. Hence the rate has been reduced to Rs. 18/- per kg. Plastering and finishing also does not require any scaffolding work, tracking work etc. Hence the cost of material plus labour at the rate of Rs. 10/- per sq.m. has been provided.

Providing, fabricating and fixing in position tor seel grills for reinforcement including cost of steel for all works. The rates include cost of binding wire also.	1 Quintal		
RTS rods	1 Quintal 100 kg.	15000 / m. tonne	1500.00
Binding wire	0.01 quintal	25.00 / kg.	25.00
Fitter 1st clas for straightening, cutting, bending, tieing and laying in position	3.5	125 each	420.00
Total			1945.00
Sundries @ 1%	L.S.		19.45
Contractor's profit @ 10%	L.S/		194.50
			2158.95
		or say Rs.	2160.00

Cost per metric tonne = Rs. 21,600/-

5 Brick Layer

Sl. No.	Description of work	Quantity	Rate/per	Amount
1.	Brickwork using locally available best table mould bricks in cement mortar 1:6 (one part of cement and 6 parts of course sand) in foundation, in basement and super structure			
	Rate for 10 cu.m.			
	Brick	5000Nos.	6000/300 Nos.	10000.00
	Cement Mortar (1:6)	2.2 cum	1152 cu.m	2534.00
	Masons I class	3.5 Nos.	120 each	420.00
	Masons II class	10.6 Nos.	100 each	1060.00
	Mazdoor category I	7.1 Nos.	75 each	532.00
	Mazdoor category II	21.2 Nos.	55 each	1166.00
				15712.00
	Water charges @1%			157.12
	Contractor's profit @10%			1571.20
	Total cost for 10 cu.m.			17440.32
	Cost per cubic meter	Rs. 1744		
2.	Half brick work (115 mm thick) using locally available best table moulded bricks in cement 1:3 (one part of cement and three parts of common sand) with 2 Nos. 30 mm x 16 mm hoop iron band on every thick course or 2Nos. 6 mm M.S. rods and embedded well in cement mortar 10 cu.m.			
	Bricks	5000	6000	3000 10000.00
	Cement Mortar (1:3)	1.4 cum	2010	cu.m. 2814.00
	Masons I class	7 Nos.	120	each 840.00
	Mason II class	7.1 Nos.	100	each 710.00
	Mazdoor category II	7.1 Nos.	75	each 532.50
	Mazdoor category II	21.2 Nos.	55	each 1166.00
	Hoop iron brand mild steel rod	95 kg	15	kg 1425.00
				17487.50
	Water charges			174.87
	Contractor's profit 10 %			1748.75
	Total			19411.12
	Area covered = $\frac{10}{0.115}$ = 86.95 sq.m.			
	Cost for one sq.m. = $\frac{19411.12}{86.95}$ = Rs. 223.25 **or say Rs. 225/- sq.m.**			
3.	Brickwork in steps of verandah/staircases in all floors or using locally available best in cement mortar 1:3 (one part of cement and three parts of coarse sand) including necessary cutting and wastage.			
	Rate for 10 cu.m.			
	Cost of brickwork in cement mortar (1:6) as per Item No. 1	10 cu.m.	22861.56	10cu.m. 22861.56
	ADD the difference in cost of cement mortar between (1:3) and (1:6)	2.7 cu.m.	840	cu.m. 2268.50
	Total			25130.06
	ADD 5% for wastage		L.S.	1256.50
	Total cost of 10 cu.m.			26386.56
	Cost for 1 cu.m. Rs. 2636.65 or Rs. 2650/- cubic metre			

6 Carpenter

Sl. No.	Description of Item	Qty.	Rate	Per	Amount
1.	Providing, supplying and fixing second class teak wood (balarsha) frames of sections 112 mm x 75 mm (finished size) for all doors and 75 mm x 63 mm (finished size) for all windows and ventilators including applying solingnum to surfaces of frames coming in contact with masnory walls 1 cu.m.				
	Teakwood second class	1 cu.m.	45000 cum		45,000.00
	Carpenter I class	4.5 No.s	120.00	each	540.00
	Carpenter II class	13.2 Nos.	100.00	each	1,320.00
	Mazdoor category	35.3 Nos.	75.00	each	2,647.50
	Sundries including nails, screws, solingum etc.		L.S.		492.50
	Sundries		L.S.		500.00
	Contractor's profit		L.S.		5,000.00
	Cost per cubic metre				55,500.00
2.	Providing, supplying and fixing teakwood (balarsha second class) door shutters of various sizes fully panelled with vertical styles and horizontal rails including the cost of necessary heavy duty anodised aluminium fittings, labour and operations involved for completing the job neatly. Panelled door shutters (two leaves) for a door width of 1220 mm. 3.34 sq.m.				
	Teakwood scantlings over 2 m. and below 3 m.	0.033	45000	per cu.m	1,485.00
	Teakwood scantling below 2 m. in length	0.023	42000	cu.m.	966.00
	External grade kitply 19 mm thick	2.0080 m	75.00	sq.m.	150.00
	Labour charges for wrought and put up for shutters fully panelled including fixing of furniture	3.34 sq.m.	270	sq.m.	901.80
	Heavy duty aluminium	6 Nos.	48.00	each	288.00
	Aluminium tower bolts at top 600 mm	2 Nos.	200.00	each	400.00
	Aluminium tower bolts at bottom - 150 mm	2 Nos.	65.00	each	130.00
	PVC door stopper 40 mm long	2 Nos.	10.00	each	20.00
	Common of 30 or 20 mm	1 No.	165.00	each	165.00
					4,505.80
	Sundries at 1%				45.05
	Contractor's profit at 10%				450.58
	Total cost for 3.34 sq.m.				5001.43
	Cost per sq.m. 1497.43 or say Rs. 1500/- per sq.m.				
3.	Panelled door shutters (single leaf) for door width of 910 mm 1.95 sq.m.				
	Teakwood scantling over 2m. and below 3 Nos.	9.0123 cu.m.	45000	cu.m.	553.50
	Teakwood scantling below 2 m.	0.0198 cu.m.	42000	cu.m.	714.00
	Exterior grade kitply 19 mm thick	1.115 sq.m.	75	sq.m.	83.63
	Labour charges for wrought and put up for shutters fully panelled including for fixing the furniture	1.95 sq.m.	270	sq.m.	526.50
	Heavy duty aluminium butt hinges	3	48	each	144.00
	Aluminium tower bolt 300 mm size	1 No.	100	each	100.00
	150 mm long	1 No.	65	each	65.00
	PVC Don stopper nylon 40 mm long	1 No.	10	each	10.00
	Common aldrop bolts of size 200 x 20 mm	1 No.	100	each	10.00
	Sundries		LS	each	3.97
					2300.60
	Sundries at 1%				23.00
	Construction profit at 10%				230.00
	Total cost for 1.95 sq.m. cost for 1 sq.m. Rs. 1310/-				2553.60

Sl. No.	Description of Item	Qty.	Rate	Per	Amount
4.	Providing, supplying and fixing fully panelled window shutters as per drawing made of second class teakwood (balarsha) with styles and rails of size 75 mm x 38 mm other than lock rail, which is of size 100 mm x 38 mm. The rate includes the cost, necessary heavy duty anodized aluminium fittings etc. - 1.3 sq.m.				
	Teakwood scantling length 2 m	0.0198 cu.m.	42000	cu.m.	831.60
	External grade kitply - 19 mm thick	0.68 sq.m.	75	sq.m.	51.00
	Labour charges for wrought and put for shutter fully panelled including the fixing of furniture	1.10 sq.m.	270.00	sq.m.	272.70
	Aulminium hinges 100 mm long	4 Nos.	35.00	each	140.00
	Tower bolts 100 mm long	4 Nos.	45.00	each	180.00
	Cabin hooks & emes 100 mm long	2 Nos.	4.00	each	8.00
	Aluminium Rings	2 Nos.	2.00	eacj	4.00
	Total cost for 1.30 sq.m.				1487.30
	Sundries at 1%				14.87
	Contractor's profit				148.73
	Total cost for 1.30 sq.m.				1650.90
	Cost per sq.m. $= \frac{1650.90}{1.30} = 1269.93$ or say Rs. 1270/- per sq.m.				
5.	Providing, supplying and fixing in the finished frame with 4 mm thick pin leaded glass for ventilator louvres spaced at 100 mm centre to centre 900 mm x 600 mm size 6' x 3'0" = 18'0" x 0'6" = 9 sft. = 0.84 sq.m.	0.84 sq.m.	216	sq.m.	181.44
	Labour charges	6.56 sq.m.	110	sq.m.	61.60
					243.04
	Add 1% for sundries				2.43
	Add 10% for contractor's profit				24.30
	Total cost for 0.56 sq.m.				269.77
	Cost per sq.m. = 481.73 or say Rs. 482 per sq.m.				
	Providing, supplying and fixing M.S. window frames and glazed shutters of size 1.5 m x 1.5 m (3 No. hung shutters) size incluidng cost of special steel sections, 4 mm thick pin headed glass, putty, pin and proivding one coat of primer, etc. as directed.				
	Towards cost of special steel section, fabrication charges, including, cutting, welding assembling.	45 kg.	30.00	kg.	1350.00
	Cost of providing priming coat	2.25 sq.m.	110.00	per sq.m.	247.50
	Cost of 4 mm thick pin-headed glass	2.25 sq.m.	216.00	per sq.m.	486.00
	Labour charges for fixing window & glass				
	Mason I class	1 No.	120.00	each	120.00
	Carpenter I class	1 No.	120.00	each	120.00
	Mazdoor I class	2 Nos.	75.00	each	150.00
	Cost of putty for fixing glass	3 kg.	10.00	per kg.	30.00
	Cost of pins for fixing glass		L.S.		24.00
					2527.50
	5% extra on labour for fixing on higher floor				126.50
					2654.00
	Sundries @ 1%				226.54
	Contractor's Profit @10%				265.40
					2945.94
	$\therefore$ cost per square metre $= \frac{2945.94}{2.25} = 1309.30$ or say Rs. 1309				

7 Pavior

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	40 mm thick cement flooring (1:2:4) with a floating coat of neat cement, including cement slurry 40 mm thick with 20 mm nominal size stone aggregate				
	Cost for 10 sq.m.				
	Stone aggregate 20 mm	0.267 m^3	464	cu.m.	123.88
	Stone aggregate 10 mm	0.089 m^3	525	cu.m.	46.73
	Coarse sand	0.178 m^3	189	cu.m.	33.64
	Mason II class	1.350	100	each	135.00
	Mazdoor Category I	0.810	75	each	60.75
	Mazdoor Category II	1.330	55	each	73.15
	Head	0.270	80	each	21.60
	Sundries			L.S.	5.25
	Extra charges for glass strips	18.00	4.00	r.m.	72.00
	Mazdoor II class	0.410	75	each	30.75
	Mason II class	0.410	100	each	41.00
	Sundries			L.S.	6.25
	Add				
	Water charges @ 1%			L.S.	6.50
	Contractor's Profit 10%				65.00
	Cement	0.170 mt	3500	m.tonne	595.00
					1316.50
	Cost per square metere Rs. 131.65 per sq.m. or say Rs. 135/-				
	Paving hydraulic pressed cement mosaic tiles of approved colour and of size 20 cm and 20 cm and 20 mm finished thickness with small Verona or Indian marble (other than Salem Magnesite) with cement mortar (1:3) 20 mm thick and pointed with the same colour. Cement including polishing with power polisher with high degree of polish so as to be perfectly smooth and glossy - 10 sq.m.				
	20 cm x 20 and 20 mm mosaic tiles (hydraulic pressed)	250 Nos.	5.00	each	1250
	Cement mortar (1:2) (labour for the tiles)	0.21 cu.m.	2680	cu.m.	562.80
	Mason I class (special category)	1.1 No.	150	each	165.00
	Mason II class (special category)	1.1 No.	120	each	132.00
	Mazdoor Category I	2.2 Nos.	75	each	121.00
	Pointing with coloured cement	22 kg.	15	kg	330.00
	Mason II class	1.6 No.	120	each	192.00
	Mazdoor - Category I	0.5 No.	75	each	37.50
	Mazdoor - Category II	1.1 No.	55	each	60.50
	Polishing				
	Hire charges for power polishing 10 m making	10 m	30	sq.m.	300.00
	Charges for temporary connection on electrical energy			L.S.	10.00
	Cost of polishing stone			L.S.	10.00
	Polisher for polishing with machine	1.1 No.	150	each	165.00
	Mazdoor category II for conveyance of water and watering	2.2 Nos.	55	each	121.00
					3456.880
	Sundries				
	Conveyance of water and watering				43.20
					3500.00
	Water charges @ 1%				35.00
	Construction profit @ 10%				350.00
					3885.00
	Cost per sq.m. Rs. 388.50 or **say Rs. 390/-**				

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	Marble Stone Flooring				
	Providing, supplying and fixing marble stone of adanga variety, hard, dense, homogeneous colour without cracks and fissures, true to shape of approved design and thickness 20 mm to 25 mm over a bed of concrete floor with cement mortar (1:3), 20 mm thick, with 40 kg. of cement for slurry and pointing with white cement mixed with colour pigment to match the colour of the stone, polishing, finishing, etc. as directed.				
	Rate for 10 sq.m.				
	Cost of marble stone including conveyance (30cm x 30 cm size)	10.5 sq.m.	520	sq.m.	5460.00
	Cement mortar (1:3)	0.21 cu.m.	2081	cu.m.	437.01
	Grey cement for slurry honey block consistency joints	40 kg.	175	50 kg/bag	140.00
	White cement for joints	20 kg.	12	per kg.	240.00
	Mason I clas (ornamental work)	2.5 Nos.	150	each	375.00
	Mazdoor - I class	2.75 Nos.	75	each	206.25
	Mazdoor - II Class	3.50 Nos.	55	each	195.25
	Hire charges for cutting machine, polishing, cleaning, etc.			L.S.	46.44
					7100.00
	Cost per sq.m. = **Rs. 710/-**				
	Providing, supplying and fixing 'Spartek' tiles over the walls and floors with best approved spartek tiles of size 20 cm x 20 cm x 6 mm thick of standard colour, laid in C.M (1:2) for 10 mm thick and painted with white cement with colour pigment for full depth of tiles including cleaning etc. complete				
	Rate for 10 sq.m.				
	Spartek tile 20 mm x 20 mm x 6 mm	260 Nos.	15.00	each	3900.00
	Cement mortar	0.1 m^3	2680	per cu.m.	268.00
	White cement with colour pigment for matching the colour	4 kg.	15.00	each	60.00
	Mason I class (special category)	1 No.	150.00	each	150.00
	Mason II class	3.7 Nos.	120.00	each	444.00
	Mazdoor I category	3.3 m	75.00	each	247.00
	Mazdoor II category	2.2 m	55.00	each	121.00
	Sundries			L.S.	22.00
					5212.50
	Water charges @ 1%			L.S.	52.13
	Contractors profit 10%			L.S.	521.25
					5785.88
	Therefore, cost/sq.m. = 578.59 or **Rs. 579**				

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	Dadooing walls with glazed tiles of size 15 cm x 15 cm x 6 mm laid in cement mortar (1:2) 10 mm thick and pointing with white cement using 0.4 kg/sq.m. including finishing the and painting flush with tile surface etc. complete - 10 sq.m.				
	15 cm x 15 cm x 6 mm white glazed tiles	450 Nos.	6.00	each	2700.00
	Cement mortar (1:2)	0.10 cu.m.	2680.00	each	268.00
	Mason I Class	1.10 No.	150	each	165.00
	Mason II Class	1.10 No.	120	each	122.00
	Mazdoor Category I (Special category)	2.70 No.	75	each	202.50
	Mazdoor Category II (Special category)	3.30 No.	55	each	181.50
	Sundries			L.S.	51.00
					3700.00
	Water charges @ 1%			L.S.	37.00
	Contractor's profit @ 10%			L.S.	370.00
					4107.00
	Cost per square meter = Rs. 410.70 or say **Rs. 411**				

8 Plasterer

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	Plastering the ceiling with cement (1:3) to 12 mm thick, including the preliminary work of hacking, erecting, scaffolding and curing with water $10m^2$				
	Cement Mortar (1:3)	$0.14m^3$	2081.00	cu.m	291.34
	Mason I class	1.10 No	120.00	each	132.00
	Mazdoor category I	0.50 No.	75.00	each	37.50
	Mazdoor category II	1.10 No.	55.00	each	60.50
	Sundries for hacking, scafold, curing etc.			L.S.	78.76
					600.00
	Water charges @ 1%			L.S.	6.00
	Contractor's profit @ 10%			L.S.	60.00
					666.00
	Cost per square metre 66.60 or say **Rs. 70 per sq.m.**				
	Plastering the wall surface with cement mortoar (1:6) to 20 mm thick inlcuding the preliminary work of cleaning the wall surface, fixing guages scaffolding work and curing with water, etc. - 10 sq.m.				
	Cement mortar (1:6)	0.22 cu.m.	1152	cu.m.	253.44
	Mason I class	2.2 Nos.	120	each	264.00
	Mazdoor category I	0.5 No.	75	each	37.50
	Mazdoor categroy II	3.2 No.s	55	each	176.00
	Sundries				69.06
					800.00
	Water charges @ 1%				8.00
	Contractor's profit @ 10%				88.00
					888.00
	Cost per square metere = 88.80 or **Rs. 90/-**				
	Providing, cement plaster to 20 mm thick in two layers for water proofing purpose the sunken areas of the toilets, corporation water pump and overhead tank. Each layer being 10 mm in thickness of cement mortar (1:4) mix mixed with Cico at 3% by weight of cement or other approved make as per manufacture, instruction including chipping of concrete surface, hacking joints, scaffolding, cleaning and curing with water - 10 sq.m.				
	Cement mortar (1:4)	$0.12\ m^3$	1626.00	per cu.m.	195.12
	Algee proof with proofing compound 360 x 0.75	360 kg.	0.75	per kg.	270.00
	Mason I class	1.1 mm	120.00	each	132.00
	Mazdoor Category I	0.5 mm	75.00	each	37.50
	Mazdoor Category II	1.1 m	55.00	each	60.50
	Sundries for hacking, chipping and cleaning			L.S.	44.80
					740.00
	Water charges @ 1%			L.S.	7.40
	Contractor's profit @ 10%			L.S.	74.00
					821.40
	Cost for one square metre = 82.14 or say Rs. 85 per sq.m. For two coats = **2 x 85 = Rs. 170 per sq.m.**				

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	Providing stucco plastering 12 mm thick using blue granite chips of size 10 mm and below over a base plastering with cement mortar (1:5) 12 mm thick 10 m^2				
	Plastering with cement motar (1:5) 12 mm thick for base	10 sq.m.	567.00	10 sq.m.	567.00
	Blue granite chips 10 mm below	0.15 m^3	3000.00	per cu.m.	450.00
	Cement	75 kg.	175.00	per bag	262.50
	Cement slurry	14.5 kg.	175.00	per bag	50.75
	Mason I class	1.6 No.	120.00	each	192.00
	Mazdoor category I	0.5 No.	75.00	each	37.50
	Mazdoor category II	1.1 No.	55.00	each	60.50
	Sundries for preparation of surface, scaffolding, curing etc.			L.S.	79.75
					1700.00
	Cost per sq.m. 170/-				
	Exposed aggregate finish				
	Providing, supplying and finishing the elevation with exposed aggregates 8 to 12 mm thick over a bed of 10 mm thick white cement paste with suitable colouring pigment/oxide incuding cost of necessary chips, pebbles of various sizes, scaffolding, laying, finishing, curing, providing, grooves 4 cm. wide, painting black; over grooves as directed etc. complete				
	For 10 sq.m.				
	White cement	150 kg.	600.00	50 kg/bag	1800.00
	Yellow oxide	1.5 kg.	10.00	per kg.	15.00
	Exposed aggregate chips	0.11 cu.m.	3000	per cu.m.	330.00
	Mason I class	2 Nos.	120	each	240.00
	Mazdoor category I	5 Nos.	75	each	375.00
	Mazdoor category II	3 Nos.	55	each	165.00
	L.S. for scaffolding, painting, etc.			L.S.	175.00
					3100.00
	Water charges @ 1%			L.S.	31.00
	Contractor's profit @ 10%			L.S.	310.00
					3441.00
	Cost per square metre = 344.10 or say **Rs. 345/-**				
	Pointing with cement mortar (1:3) to full depth of tiles (marble slabs, pressed tiles, metal tiles) - 10 sq.m.				
	Cement mortar (1:3)	0.04 cu.m.	2081	cu.m.	83.24
	Mason II class	2.2 Nos.	100	each	220.00
	Madoor category I	0.5 Nos.	75	each	37.50
	Mazdoor category II	1.1 No.	55	each	60.50
	Sundries			L.S.	8.76
					410.00
	Water charges @ 1%				4.10
	Contractor's profit @ 10%				410.00
					455.10
	Cost per square metre = Rs. 45.51 or say **Rs. 46 per sq.m.**				
	Note: Cost of plastering with c.m (1:5) 10 sq.m.				
	Deduct the cost of C.M. (1:3) and (1:5) for the plastering cot of				
	C.M. (1:3) 12 mm thick plastering C.M. (1:3) 12 mm	10 sq.m.	666.00	10 sq.m.	666.00
	Difference in mortar (0.14 x				99.00
					567.00

9 Decorator

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	White washing with fine screened shell lime (600 kg/cu.m.)	0.09 cu.m. = 59 kg.	5.00	per kg.	270.00
	Gums, sizeing water or prickly pear juice including necessary fire wood			L.S.	12.00
	Painter	2.2 Nos.	100	each	220.00
	Helper category I	0.5 No.	75	each	37.50
	Helper category II	3.8 Nos.	55	each	209.00
	Sundries including brushes, etc.			L.S.	151.50
					900.00
	Water supply @ 1%			L.S.	9.00
	Contractor's profit @ 10%			L.S.	90.00
					999.00
	Cost per sq.m. = 9.99 or Rs. 10				
	Colour washing two coats with water proof cement paint after complying with all preliminary works including curing with water for 7 days				
	Rate for 10 sq.m.				
	Water proof cement paint	3.23 kg.	35.00	kg.	113.05
	Painter I class	0.50 No.	120.00	each	60.00
	Helper category I	0.50 No.	75.00	each	27.50
	Helper category II	0.80	55.00	each	44.00
	Sundries for brushes, etc.			L.S.	15.45
					260.00
	Water charges @ 1%				2.60
	Contractor's profit @ 10%				26.00
					288.60
	Cost per square metre = Rs. 28.86 or **Rs. 30/- per sq.m.**				
	Priming coat on new wood work with ready mixed primer of approved quality with all necessary preliminary works - 10 sq.m.				
	Ready mixed paint	1.44 kg.	400.00	5 kg.	115.20
	Painter 1st class	0.70 No.	120	each	84.00
	Sundries including brushes, sand paper etc.			L.S.	20.80
					220.00
	Water charges @ 1%				2.20
	Contractor's profit @ 10%				22.00
					244.00
	Cost per square metre = Rs. 24.40 or **Rs. 25 per sq.m.**				

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	Painting two or more coats with synthetic enamel paint of approved make and shade over one coat of primer paint of approved make for new wood work to get an even shade - 10 sq.m.				
	Wood primer	1.44 litres	400	5 lits.	115.20
	Synthetic enamel paint	2.55 litres	1377	10 lits.	351.14
	Painter I class	1.90 Nos.	120	each	228.00
	Sundries for brushes, sand paper, etc.			L.S.	59.66
					750.00
	Water charges @ 1%				7.50
	Contractor's profit @ 10%				75.00
					832.50
	Cost per sq.m. = Rs. 83.25 or **Rs. 85/-**				
	Brick facia, tiles with verical joints 10 mm wide grooves				
	Proividng, supplying and fixing over walls upto 4 m. height with machine pressed tiles of size 2.3 cm x 7.5 cm. x 1cm. over a bed of 10 mm cement mortar (1:2) including scaffolding,. curing, colour painting two coats over the 10 mm grooves horizontally and vertically between tile setc. complete as directed - for 10 sq.m.				
	Cost of facia tiles 23 cm x 7.5 cm x 1 cm.	540 Nos.	3.00	each	1620.00
	Cement mortar (1:2)	0.12 cu.m.	2680	cu.m.	321.16
	Mason class I (Special category)	3 Nos.	150	each	450.00
	Mazdoor class I	2.50 Nos.	75	each	187.50
	Mazdoor class II	3.00 Nos.	55	each	165.00
	Painting over grooves two coats of approved paint	1.50 sq.m.	100	sq.m.	150.00
	Cost of scaffolding, hacking, cleaning the surfae etc. complete			L.S.	375.00
	Sundries			L.S.	31.34
					3300.00
	Water charges @ 1%				33.00
	Contractor's profit @ 10%				330.00
					3663.00
	Cost per sq.m. 366.30 or say **Rs. 370 per sq.m.**				

10 Weathering Course

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	Concrete broken brick jelly 20 mm uniform size in pure slacked lime over RCC roof slab. The proportion being 32:12.5 for required depth of 80 mm; for giving required slope and thickness to roof as required, well beaten with wooden mallet etc. complete - 1 cu.m.				
	Brick jelly 200 mm dia.	12.8 cu.m.	400	cu.m.	5120.00
	Slaked lime	5.0 cu.m.	500	cu.m.	2500.00
	Mason 1st class	1.8 Nos.	120	each	216.00
	Mazdoor category I	17.7 Nos.	75	each	1327.50
	Mazdoor category II	14.1 Nos.	55	each	775.50
	Sundries for gur, kadukkai, etc.		L.S.		61.00
					10000.00
	Water charged @ 1%				100.00
	Contractor's profit @ 10%				1000.00
	Total cost for 10 cu.m.				111000.00
	Area covered = $\frac{1 \text{ cu.m.}}{0.08}$ = 12.5 sq.m.				
	Cost per sq.m. = $\frac{1110}{12.5}$ = Rs. 88.80 or Rs. 90/- per sq.m.				
	Terrace flooring with one course of pressed tiles 20 cm. x 20 cm. and 20 mm thick using cement (1:3) mixed with crude oil, 10% by weight of cement and pointed with same mortar 10 sq.m.				
	Pressed tiles - 20 cm. x 20 cm and 20 mm thick	250 Nos.	3.00	each	750.00
	Cement mortar (1:3)	0.12 cu.m.	1970	cu.m.	236.40
	Crude Oil	5.8 Litre	50	litre	290.00
	Pointing with cement mortar (1:3) mixed with crude oil	10 sq.m.	40	sq.m.	400.00
	Mason I Class	1.1 No.	120	each	120.00
	Mason II Class	2.1 No.	100	each	210.00
	Mazdoor Category I	2.2 No.	75	each	165.00
	Mazdoor Category II	1.1 No.	55	each	60.50
	Sundries				8.60
					2240.00
	Water charges @1%				22.40
	Contractor's profit @ 10%				224.00
	Cost per square metre - Rs. 248.60 or say Rs. 250/- per sq.m.				2486.40

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	Providing, supplying and fixing over RCC sloped roof with one course of curved decorative pressed rain proof tiles of standard brand and of size 23 cm x 15 cm x 2 cm laid with 5 cm over lap cement mortar (1:3) 20 mm thick mixed with water proof compound at 2% by weight of cement consumed and sides of tiles painted with same mortar added with red oxide to required quantity as directed. (The rate is including laying, curing and finishing the ridges and values as directed by the Engineer-in-charge) Rate for 10 sq.m.				
	Decorative rain proof pressed tiles of size 23 cm x 15 cm x 2 cm with 5 cm. overlap	390 Nos.	3.00	each	1170.00
	Cement mortar (1:3) with water proof compound	0.25 cu.m.	2330.00	cu.m.	582.50
	Pointing tiles with cement mortar (1:3) with red oxide	10 sq.m.	40.00	sq.m.	400.00
	Mason I class	3.5 Nos.	120.00	each	420.00
	Mazdoor Category I	2.5 Nos.	75.00	each	187.50
	Mazdoor Category II	1.25 Nos.	55.00	each	68.75
	For finishing ridges		LS		21.25
					2850.00
	Water charges @1%		LS		28.50
	Contractor's profit @ 10%		LS		285.00
	Cost per sq.m. = Rs. 316.25 or Rs. 320/- per sq.m.				3163.50

Derivation of rates for providing Centering to an open helical stair case

Central Well	:	1 .00 m diameter
Waist Slab	:	1 .35 m wide & 28 cm thick
Risers	:	15 cm.
Ceiling height	:	3.40 m.

General Note:

For making the path of waist slab and for correct geometrical shape at different elevation and plane, it is necessary to construct temporary brick masonry in C.M 1:6. This construction has to be done for full circle for inner well upto 3.4 m. ht. and for outer diameter at different heights from floor to the required elevation (i.e.) 60 C.M above waist bottom, to act as side centering on waist and riser concrete at outer end.

DETAILED DATA

Sl. No.	Description	Quantity	Rate	Per	Amount
	Construction of temporary circular brick work in C.M 1:6 (50% of bricks for reuse after dismantling)	8 Cu.m.	X	M^3	8X
	Centering charges for waist slab curved and to be formed at different planes	10 M^2	Y	M^3	10Y
	For dismantling the brick masonry cleaning and removal out of site.	L.S.	L.S.		Z
	Rate/M^2 = Rs. 455				4550
	This rate is 6.5 times normal prevailing plain centering rates.				
	Therefore for estimation, a co-efficient of 5 to 6 over the rates for plain centering can be considered for the waist of helical stair cases.				

Approximate requirement of Steel

S. No.	Type of Members	Quantity of Ribbed Tor Steel reinforcement in Kg /M^3 Concrete	Variety on General Requirement
1	Column Footings	75	10 mm or 12 mm diameter
2	Grade Beams	100	12, 16 mm dia 85% & 8 mm - 15%
3	Plinth Beams	125	8 mm dia - 85% - 15%
4	Columns	225	16, 20, 22 mm dia - 90% & 8 mm - 10%
5	Lintel tie column to column	125	12, 16 mm dia - 85% & 8 mm - 15%
6	Sunshades	60	8 mm dia
7	Canopy Slab upto 2 Meter Span	125	10 mm dia - 80% & 8 mm dia - 20%
8	Waist Slab	150	12 or 16 mm dia - 85% & 8 mm dia - 15%
9	ROOF SLAB: Singleway Bothways Sq. slab 4 to 6 m size	 80 100 150	 10-12 mm dia - 100%
10	Main beams above 6 m	250	20, 16,12 mm dia - 85% & 8 mm 15%

GENERAL

Cement mortar, when mixed with water is to be consumed on work within 30 minutes.

For R.C.C. Column, 75 mm high concrete' should be laid first as shoe over footing to maintain alignment. verticality and shape. The reinforcing bars shall be kinked and straightened to have uniform cover all-round.

Columns at two ends and at centre are raised first and then the remaining to maintain the alignment in multi-storeyed buildings.

CONSTRUCTION

Bricks for construction are soaked in water tub till bubble ceases. Bricks are to be kept over planks. During brickwork vertical joints are broken and joints are properly filled with mortar.

In basement filling consolidation is to be done by ramming with crow bars after flooding entire area with water.

Bars are kept in position after centering is levelled and checked on beam locations. Concealing of pipes for electrification to be kept. First laying of reinforcement, for slab is started from the edge of the support.

Remove the vibrator from concrete after the slurry and cavity formed due to prolonged vibration and fill cavities with concrete.

FINISHING

Check all verticality of fins, drops, etc. and horizontality of sun-shade and projections by with thread lines.

All Scaffolding hales in the masonry and door damps are to be filled with cement concrete 1:3:6.

All plasterings should be of smooth finish with steel trowel. Sand is to be screened with 144 mesh. All corners and edges of beams and walls should be finished with cement mortar 1:3 to have knife edge.

Rubber bushes should be kept such that door handle does not touch the wall first. Magnetic door catches are to be fixed close to hinge points (30 cm) and not at the end of the shutters. This will have good catching of the shutters.

Paint the trusses and purlins with approved colour before erection. Do necessary white washing over the rough surfaces of AC sheets as is being dons over the ceiling before erection on trusses.

Greasing of bearings far rolling shutters to be done before using the shutters.

SERVICES

Verticality of pipe lines and their horizontality should be maintained in fixing the water lines.

Air vents with down elbows are to be given in all delivery lines above over head tank.

For pumping arrangements provision for non-return valve, gate valve for priming should be provided in all cases.

Soak pits are not to be provided in clay and black cotton soil. Ventilating pipes should be provided in the first chamber of septic tank.

Foundation and basement: In case of black cotton soils and other expansive soils under -reamed pile foundation is to be resorted. Proper care for bulb formation at cohesive soil area is to be ensured.

Mud mat Concrete: Below R.C. foundation footing can be 7.5 cm thick with cement concrete 1:5:10. For water retaining structures, it may be In 1:4:8 with a minimum of 15 cm thick.

Basement height: 60 cm above road level or 30 cm above H.F.L. whichever is more.

Refilling in basement: Expansive clay earth is to be avoided. Only sand filling is to be resorted. It is to be ensured that the entire filling in basement for Godowns and drying yards platform, is done with sand only and not with any excavated or transported earth.

For load bearing walls the mortar is to be of cement mortar 1:5 For non-load bearing walls like in framed structure a mix at cement mortar 1:8 can be followed.

Critical piers: For Critical piers using C.C. 1:3:6 mix provide 8 mm RTS as main rods and 6 mm for rings to keep the main bars in position. R.C.C. 1:2:4 mix to be used for Critical piers above lintel upto beam level.

Brick on edges: It can be laid at Plinth level below lintel and below roof level. This will withstand disturbances caused by Carpenters doing centering operations.

Dummy Columns: Columns for future expansion is to be finished with C.C. 1:2:4 for 40 cm height above roof and then remaining 1.2 m to 1.5 m height is finished with C.C. 1:8:16 using 20 mm HBG Jelly. It is to be plastered with cement mortar 1:4 – 12 mm thick using acro proof cement mix Brick jelly should not be used for dummy columns.

R.C.C. Parapet: Always provide R.C.C. Parapets unless otherwise specified. All projections should have rain water dip bank for 12 mm thick, 40 mm wide, 20 mm away from edges.

Walls plastered with cement mortar 1:3 for 1.5 m height and given cement/paint of authentic colour.

Open wall, flooring is paved with P.C.C. slab 1:3:6 over 15 cm sand cushion and can be 15 cm below rear verandah floor. Grills for open-yards weights about 30 Kg/rn²

For Mosaic Floor: For Mosaic flooring - No. 8 chips is to be adopted using parrot green, blood red (or) lemon yellow and white marble chips of equal proportion. For Hospitals blood red is to be avoided.

Mosaic Stone cutting for polishing

First	:	No.60
Second	:	No.120
Third	:	No.320
Final	:	Wax Polishing.

Partition Walls: All partitions should have proper foundation from 15 cm below Ground level and should not be taken from flooring concrete. It is better to have grade beams connected wherever partitions are to be taken in framed structures. 23 cm thick wails is to be constructed upto 20 cm below floor with regular concrete 1:5:10, 15 cm thick. Over the 23 cm thick wall, partitions can be taken. All partitions not taken upto roof beams level can be stopped over top door frame with one course of brick and lintel and not to be stopped at door level itself.

HAND RAILS & BALUSTRADE

Hand rail is the top member which is slanting as in case of staircase and horizontal top member in case of balconies.

Balustrade refers to vertical grill members supporting the hand rail.

Generally M.S. Square bars are used for balustrades with 20 mm square bars spaced at not more 15 cm c/c with M.S. flat at top throughout for supporting Teak wood member.

Teak wood (or) G.I. Pipe hand rail can be used as well as Aluminium hand rail preferably anodised in black colour.

For staircase side projection in schools, cyclone shelter, quarters upto 80 Sq.m plinth area, RC Parapet 5 cm thick can be adopted. Top 15 cm height finished with red oxide smooth.

Hand/rail top is to be 78 cm for staircase and 90 cm for balcony and in verandah sit out.

For teakwood hand railing a size of 150 x 50 mm size can be adopted. A grove 12 mm in both faces at 50 mm below from top to be provided. The hand rail is to be French polished and groves painted with black colour paint.

Fan Hooks: It is provided considering the usable areas. In Jail building far Lock-up's fan hook should not be provided. Fan hooks should receive one coat of prime red oxide and finished with oil paint to match with ceiling colour. Fan clamps should not be placed at 1.35 m bearer to any walls for blades/wings to be affected. Adopt 12 mm dia M.S. plain rode far hook..

Sequence of operations for Weathering Course:

1. Ceiling to be raised at bottom and made rough.
2. Brick jelly lime concrete to be laid and tamped the slop, being 1 in 40 to 1 in 50.
3. Ceiling plastering.
4. Finally laying of pressed tiles.

Only pressed tiles 20 cm x 20 cm x 20 cm thick set in cement mortar 1:3 using water proof compound 2% by weight is to be used and pointed with same mortar.

One 100 mm dia AC rain water pipe can cover 40m^2.

All court yards open to sky portion in yards are to be protected with 18 mm dia. M.S. rods at 16 cm c/c inserted in the holes of MS angle. 50 x 50 mm at 90 cm c/c in shorter direction. 30 Kg/m^2 may be considered for estimate purposes.

Doors, Windows, Ventilators: For quarters, schools and inspection Bungalows only 4 leave shutters upper and Lower type to be provided. This is to have privacy for inmates.

Panelled Shutter:

Planks	:	22 mm thick
No.of Panel	:	Five
Floor clearance	:	5 mm
T.W.beading for Glazing	:	12 x 15 mm
Top and intermediate & side verticals	:	l00 x 40 mm
Railing	:	100 x 40 mm
Lock rail	:	175 x 40 mm
Bottom	:	150 x 40 mm

Frames:

Doors with one shutter only	:	100 x 75 mm
Doors with 2 shutters i.e. plain Panel & another door for fly proof	:	130 x 75 mm
Entrance Main doors more than 2m	:	150 x 100 mm
Grooved jointed type of flanged door on 1/3 panel & 2/3 Glazed	:	100 x 25 panels
Window frames with Grills to be used	:	100 x 65 mm
Window using bars lees than 1.2 m width	:	75 x 65 mm
Window using bars more than 1.2m width Ventilators	:	75 x 65 mm
Ventilators	:	75 x 35 mm

Stylus of windows: Single shutter 75 x 35 mm

All frames and shutters should receive one coat of white primer before fixing in position.

The hold fast should receive one hot boiled tar paint. The hold fast should be set in C.C. 1:2:4 only.

Furniture Fittings: All tower bolts can be aluminium type, since they facilitate easy operation and economical.

Hinges: Aluminium or galvanised iron as per the quality. GI Screws/Aluminium screws to be used for T.Bolts, hinges, etc.

Hookes & eyes to be galvanised iron as they are strong and aluminium gets damaged early.

Aldrops: Brass oxidised quality.

Anodised aluminium for Entrance doors heavy quality brass chromium plated.

Cabin hooks & Eyes: Sturdy oxidised iron quality. Aluminium hinges for inner window shutters and rubber bush for exterior side should be provided.

Panelled doors: Should have rubber bush and wind blocks.

Flush shutters: Rubber bush & Magnetic door catcher. All door closures should be ISI marked quality.

Colour washes and paintings

For exterior walls	:	ivory colour (lime wash)
For projections, fins, column faces	:	creame colour to be adopted.

For bottom sunshades, canopy to have white colour only.

The following approved varieties of paints can be adopted.

For Doors and Windows	:	Off white (or) New Ivory
For Primer	:	white Primer
Rear side of doors and windows	:	Anti-corrosive bitumen paint.

For hand rails M.S. rods can be painted alternatively black and white.

All G.I. Pipes for water supply arrangements should be given priming coat of red oxide with necessary ivory paint two. coats, both inside and outside building.

All cast iron pipe lines should also be finished with two coats of Ivory paint to have aesthetic look.

For Estimation purposes & for General Informative knowledge weights for Grills/Gates

Window bars 16m dia	:	12 Kg/m²
Grills for windows (m.s.)	:	20 Kg/m²
Grills gate for yards	:	25Kg/m²
Open to sky protection	:	25 Kg/m²
Porch hand rail with 40 mm dia G.I. Pipe and Grill	:	25 Kg/m²
Open wall cover with R.S.J. beam angles and 16 mm dia MS bar	:	30 Kg/m²

Flush shutter : Solid flush shutter weights about 20-23 Kg/m² (ISI) specification. The size of an A.C. box well type is 60 cm wide 70 cm from wall face and about 50 cm depth.

11 Sanitary Works

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	Providing and fixing vitreous white china, water closet, squatting type (Indian) with foot rest 100 mm size sand cast (P or S trap) with 10 litres capacity PVC flushing cistern of approved make with necessary internal fittings and brackets. 15 mm size, PVC supply pipe with full way wheel valve, PVC handle, 40 mm dia. PVC flush bend with fittings and clamps, 20 mm size over flow pipe with special mosquito proof coupling of approved municipal design including cutting and making good the walls and floor wherever required.				
	Size 58 cm. - 1 No.				
	IWC - 580 mm x 440 mm	1 No.	300	each	300.00
	Foot rest	1 pair	92	each	184.00
	P or S Trap - 100 mm dia	1 No.	200	each	200.00
	Flushing cistern (PVC) low level * 10 litres capacity	1 No.	600	each	600.00
	Aluminium Brackets	1 pair	100	pair	100.00
	PVC Flush Pipe (40 mm/dia)	1 No.	120	each	120.00
	Fitter	1.25 No.	120	each	150.00
	Mason I class	0.50 No.	120	each	60.00
	Mazdoor category I	1.00	75	each	75.00
					1789.00
	Sundries for making hard the surface				111.00
					1900.00
	Water charges @1%				19.00
	Contractor's Profit @ 10%				190.00
					2109.00
	Providing and fixing white vitreous china white colour European pan type with black seat cover with brass hinges and rubber buffer, 10 litre capacity low level pushing cistern of PVC approved make with necessary internal fittings, brackets, 15 mm size, PVC supply pipe with full way valve, wheel valve PVC handle, 40 mm dia PVC flush bend with fittings and clamps 20 mm size over flow pipe with mosquito proof coupling of approved municipal design, including cutting and making good, the walls and the floor wherever required.				
	Size 89.5 cm x 50 cm. x 78 cm.				
	EWC Pan (White)	1 No.	716	each	716.00
	Flushing cistern (PVC) low level tank with all internal fittings	1 No.	600	each	600.00
	Aluminium Bracks	one pair	100	one pair	100.00
	PVC Flush pipe rigid 40 mm dia	1 No.	120	each	120.00
	Black plastic seat cover lid with C.P. brass hinges	1 No.	413	each	413.00
	Fitters	1.25 No.	120	each	150.00
	Mason I Class	0.500	120	each	60.00
	Mazdoor Category I	1.000	75	each	75.00
	Sundries		LS		66.00
					2300.00
	Water charges @ 1%				23.00
	Contractor's profit @ 10%				230.00
					2553.00
					or say Rs. 2600/-

Sl. No.	Description of Item	Quantity	Rate	Per	Amount (Rs.)
	Providing and fixing white vitreous china wash basin with cast iron brackets painted white, 15 mm CP brass Pillar top with CP waste coupling completely of standard make with 32 mm size PVC waste pipe, 15 mm size PVC supply pipe with full way wheel valve.				
	Size 63 cm x 50 cm (white)	1 No.	1100	each	1100.00
	CP Brass Pillar top	1 No.	260	each	260.00
	CP Brass chain with 32 mm size rubber plug	1 No.	20.00	each	20.00
	CP Brass standard waste coupling 32 mm dia.				
	C.I. Brackets	One pair	25.00		50.00
	PVC Waste Pipe - 32 mm dia	1 No.	50.00	each	50.00
					1580.00
	Red lead, white lead and gaskin		LS		15.00
	Cement sand and grit		LS		15.00
	Fitter	0.300	120.00	each	36.00
	Mason I class	0.330	120.00	each	39.60
	Mazdoor category I	0.630	75.00	each	47.25
	Sundries			LS	11.15
	Cot of pedestal is to be added	1 No.	356	LS	356.00
					2100.00
	Water charges @ 1%			LS	21.00
	Contractor's profit @ 10%				210.00
					2331.00
				or say Rs. 2400/-	
	Cost of wash basin with pedestant = rs. 2400/-				
	Cost of wash basin without pedestant = Rs. 1908/-				
	Providing and constructing brick masonry manhole chamber using locally available best table moulded bricks in cement mortar (1:5) RCC top cover slab of 15 cm. thick, foundation concrete (1:4:8) plastering inside 12 mm thick with cement mortar (1:3) finish with a floating coat of neat cement slurry and making channels in cement concrete (1:2:4) neatly finished complete as per design 91 cms. x 76 cm.s and depth 91 cm.				
	Earth work excavation	3.00 cu.m	70	1 cu.m.	210.00
	Sand filling in foundation to 15 cm thick	0.50 cu.m.	235	1 cu.m.	117.50
	PCC (1:4:8)	0.36 cu.m.	1250	1 cu.m.	486.00
	PCC (1:2:4) for the channel	0.11 cu.m.	2245	1 cu.m.	246.95
	Brickwork in cement mortar (1:5)	1.00 cu.m	2290	1 cu.m.	2290.00
	Plastering inside with (1:3)	4.00 cu.m.	70	1 sq.m.	280.00
	RCC cover slab 15 cm. thick with reinforcement	0.25 cu.m.	460	1 cu.m.	1150.00
	Mason I class	0.060 Nos.	120	each	7.20
	Mason II class	0.60 Nos.	100	each	6.00
	Sundries			LS	6.35
					4800.00
	Water charges @1%				48.00
	Contractor's Profit @10%				480.00
					5328.00
				or say Rs. 5400/-	

TESTING CHARGES

(During the year 2007)

Sl No.	Specimen/ Sample	Nature of test	Rate/Each Rs.	Quantity Reqd.	Grand Total	Per Set Rs.
1	CONCRETE CUBES IS : 516 -1959 (Reffd -1999)	Compressive Strength	270	3 Nos (One Set)	270	270/-
2	CONCRETE CYL. CORES IS:14959 (Part II) 2001	Compressive Strength	675	3	2025	2025/-
		Chemical Test like Chloride, Sulphate	450	3	1350	1350/-
3	CONCRETE BEAMS	Flexural Strength	675	3	2025	2025/-
4	HOLLOW/ SOLID BLOCKS IS : 2185(P 1) -1979 (Reffd -1992)	Compressive Strength	270	8	2160	3240/-
		Water Absorption	225	3	675	
		Block Density	135	3	405	
5	PAVER BLOCKS	Water Absorption	270	3	810	2565/-
		Compressive Strength	270	3	810	
		Flexural Strength	315	3	945	
6	BRICKS/ FLY ASH BRICKS IS: 1077-1992 & IS: 3495 -(P1 to 4) -1992 IS:12894-2002	Water Absorption	225	5	1125	3150/-
		Compressive Strength	270	5	1350	
		Efflorescence	135	5	675	
		Dimension test	270	20 Nos.	270	270/-
7	COARSE AGGREGATE IS:2386-1963 (Reffd -1990)	Sieve Analysis	315	30-40 Kgs (1 bag)	315	4810/-
		Specific Gravity	270		270	
		Bulk Density	180		180	
		Flakiness & Elongation Index	450		450	
		Water Absorption	270		270	
		Impact Value	360		360	
		Crushing Value	360		360	
		10% Fines Value	450		450	
		Deleterious Materials	450		450	
		Soundness	1075		1075	
		Moisture Content	180		180	
		Chloride, Sulphate	450		450	

8.	FINE AGGREGATE IS:2386-1963 (Reffd -1990)	Sieve Analysis	315	20 Kgs	315	3769/-
		Specific Gravity	270		270	
		Bulk Density	224		224	
		Bulking & Moisture Content	445		445	
		Silt Content	270		270	
		Deleterious Materials	450		450	
		Soundness	1075		1075	
		Water Absorption	270		270	
		Chloride, Sulphate	450		450	
9	CEMENT IS: 4031 -1991 (Reffd-2005) & IS: 4032 -1985 (Reffd - 2005)	a) Physical test Consistency, Initial & Final Setting time Compressive Strength for 3, 7 & 28 days Fineness (by Blaine's air permeability method) Soundness (Le-Chatelier's method)	1435	25Kgs	1435	1435/-
		b) Chemical Test Anaylsis & Determination of 10 constituents	1255	5Kgs	1255	1255/-
10	FLYASH IS: 3812-1981 (Reffd - 2003) IS: 1727-1967 (Reffd -1999)	Physical Properties	2155	IO kgs	2155	3410/-
		Chemical Properties	1255		1255	
11	WATER IS:456 - 2000	Suitability for Concrete	900	ILtr	900	900/-
12	REINFORCING STEEL IS 1786 - 1985 (Reffd - 2000) IS: 228- 1959 (Reffd-1992) IS: 1608-1995	Tensile test	270	3 Nos. (70cms)	810	1485/-
		Bend Test	90	3 Nos. (30cms)	270	
		Rebend Test	135	3 Nos. (40cms)	405	
		Chemical Properties	540	3 Nos. (IOcms)	1620	1620/-
		Weight per Mtr	45	1 Mtr. X 3Nos	135	135/-

13	SPLICED JOINT IS: 9417 -1989 (Reaffirmed 1994) IS1786-1985 (Reaffirmed-2000)	Tensile Test	675	3	2025	2025/-
14	STRUCTURAL STEEL IS:2062-1999 IS:432-1982 (Reffd -1995) & IS: 228-1959 (Reffd -1992)	Tensile Test	495	50 L-3Nos	1485	3780/-
		Bend Test	225	30 L-3Nos	675	
		Chemical Properties	540	10 cms-3	1620	
		Weight per Mtr	45	1 Mtr-3Nos	135	135/-
15	WELDED JOINT IS: 9417 -1989 (Reaffirmed 1994) IS:1786-1985 (Reaffirmed-2000)	Tensile Test	445	3	1335	1335/-
16	WOOD IS:11215-1991 (Reffd -1996)	Moisture Content	270	3	810	810/-
17	ALUMINIUM	Weight/mtr.	90	0.50 mtr 3Nos	270	1620/-
		Coating Thickness	450		1350	
18.	GRANITE IS:121 (Part 1) -1974 (Reaffirmed -1998) IS:1124 - 1974 (Reaffirmed -1998)	Density	180	5	900	6075/-
		Compressive Strength	450	5	2250	
		Water Absorption	270	5	1350	
		Flexural Strength	315	5	1575	
19	MARBLE IS:1130 -1969 (Reffd -1993)	Specific Gravity	270	5	1350	4725/-
		Moisture Absorption	270	5	1350	
		Hardness	135	5	675	
		Flexural Strength	270	5	1350	
20	CERAMIC/ GLAZED TILES IS: 13630-1993 1S:13753-1993 (Reffd -1998)	Water Absorption	225	6	1350	5940/-
		Flexural Strength	270	6	1620	
		Warpage	225	6	1350	
		Crazing Resistance	270	6	1620	
		Dimensions	90	6	540	6750/-
		Chemical resistance	675	6	4050	
		Hardness	90	6	540	
		Perpendicularity	135	6	810	
		Squareness	135	6	810	

21	MOSAIC/ CONCRETE TILES IS:1237 -1980 (Reffd - 2001)	Flatness	135	6	810	2430/-
		Perpendicularity	135	6	810	
		Straightness	135	6	810	
		Hardness (Moh's Scale)	135	6	810	3780/-
		Water Absorption	225	6	1350	
		Wet Transverse Strength	270	6	1620	
22	ROOFING TILES IS:2690 (P1) -1993 (Reffd.-1998) IS:2690(P2)-1992 (Reffd-1997)	Flexural Strength	270	6	1620	4320/-
		Water Absorption	225	6	1350	
		Warpage	225	6	1350	
23	MANGALORE TILES IS:2690 (P1) -1993 (Reffd.-1998) IS:2690(P2)-1992 (Reffd-1997)	Breaking Load	270	6	1620	2970/-
		Water Absorption	225	6	1350	

GENERAL INFORMATION

Bricks :

As per IS:5454-1969(RA-1991) 20 bricks have to be tested for a lot of 2,001 to 10,000, of which 5 numbers each for compressive strength, water absorption efflorescence tests.

Hollow / Solid Blocks :

As per IS: 2185 (Part-I) - 1979 (Reaffirmed-1992) Hollow or Solid Blocks, a minimum of 20 blocks to be taken from every consignment of 5,000 blocks, out of which 3 for block density, 8 for compressive strength, 3 for Water absorption. (3 for Drying Shrinkage and remaining 3 are for retest of drying shrinkage, if necessary).

Marble

As per IS.-1130 - 1969 (Reaffirmed 1993)

Minimum 3 Nos	for	0 to 25 Nos.
Minimum 5 Nos	for	25 to 100 Nos..
Minimum 8 Nos	for	101 to 200 Nos..
Minimum 13 Nos	for	201 to 500 Nos.
Minimum 20 Nos	for	501 to 1000 Nos.

Ceramic Tiles

No. of samples as per Table-1 of IS: 13711-1993. A minimum number of 20 tiles taken out of one homogeneous consignment is required for the whole series of tests for Ceramic tiles.

Mosaic Tiles

No. of samples as perTable-1 of IS:1237-1980 (RA-1990) for Mosaic tiles is a min. of 6 Nos. for each test.

Roofing Tiles :

As per 2690-1993, min. of 6 tiles to be tested (for each test) for 1000 Nos. of tiles.

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LIST OF BOOKS WRITTEN BY THE AUTHOR

Plans

1. Sketch Plans for Houses
2. Plans for Small Houses
3. Plans of Duplex Houses
4. Plans of Row Houses
5. Plans of Cottage Type Houses
6. 60 Plans
7. Plans for Flats and Commercial Centres
8. Plans for Flats, Garden Apartments and Commercial Centres
9. Plans for Row Houses, Duplex Houses and Cottage Type Houses
10. Plan for 30' x 40' Plots
11. Plans for Detached Houses and with Mezzanine Floors
12. Plans for Vastu Houses
13. Plans for Mid Size Plots

General

14. Case Laws on Flats, Registration and Taxation
15. Manual on Building Contracts
16. House Buildings – Inspection and Maintenance
17. Construction Practices in Civil Engineering Works
18. Rate Analysis and Testing of Materials
19. Professional Practice for Architects and Consulting Civil Engineers
20. The Agony and Ecstasy of House Building
21. Build Your House Yourself
22. Professional Lapses in Failure of Structures
23. Valuation Practice of Immovable Properties
24. Arbitration Act in Building Contracts. Scope for Engineers and Architects
25. Urban Land at What Cost and Price
26. Real Estate Practices
27. Flats and (F) Acts
28. Ownership of Flat
29. A Roof Over Your Head
30. Concise Building Dictionary
31. House Site in Urban Areas
32. Disputes in Building Contracts
33. Building Rules, Ambiguities and Violations
34. Purchase of Flats and Arbitration Act
35. Value of Properties in Chennai in select areas 1991-2000
36. Building Construction – Statutory Requirements, Penalties and Case Laws
37. Model Formats of Deeds and Agreements in Real Estate Transactions and Building Construction
38. Apartments, At What Cost ? At What Price?
9\. Dealings in Real Estate and Housing
40. Violation of Building Rules and Encroachment for Deed or Greed
41. Disputes in Land Dealings
42. Disputes in Registration of Immovable Properties and Fixation of Stamp Duty
43. Official or professional Lapses - Remedies for the Aggrieved
44. Disparities and Disputes in Valuation of Lands

Tamil

45. உங்கள் வீட்டை நீங்களே கட்டலாமே
46. வீட்டைக் கட்டிப்பார்
47. மனை மற்றும் கட்டடங்களுக்கான வாஸ்து குறிப்புகள்
48. வீடு, மனை மற்றும் கட்டடங்களின் சொத்து மதிப்பீடு முறைகள்
49. ஃபிளாட் (Flat) சொந்தக்காரர்களின் உரிமைகள் என்ன?